

Partial FCC RF Test Report

APPLICANT : Acer Inc.
EQUIPMENT : WLAN Module
BRAND NAME : Acer, Gateway, PackardBell
MODEL NAME : AR5B93
FCC ID : HLZ-AR5B93
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : Digital Transmission System (DTS)

This is a partial report which is only valid combined with the integrated WLAN module (Brand Name: Atheros / Model Name: AR5B93 / FCC ID: PPD-AR5B93) report.

The product was installed into Notebook Computer (Brand Name: Acer, Gateway, PackardBell / Model Name: KAVA0, KAV60, KAV80 / Marketing Name: AOP150, AOP531, Aspire one, AOD210, AOD250, LT20, dot s, dot sr) during the test.

The product was received on Jul. 06, 2009 and completely tested on Aug. 02, 2009. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR931617-21	Rev. 01	Initial issue of report	Aug. 06, 2009



SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	A8.5	Frequency Band Edges	$\leq 20\text{dBc}$	Pass	-
3.2	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 15.7 dB at 16.102 MHz
3.3	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 6.42 dB at 239.79 MHz
3.4	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Acer Inc.

8F., No. 88, Sec. 1, Hsin Tai Wu Rd., Hsichih, Taipei Hsien 221, Taiwan, R.O.C.

1.2 Manufacturer

1. Compal Electronics (China) Co., Ltd.

No. 988, Tong Feng East Rd., Kunshan Economics & Technical Development Zone, Kunshan, Jiangsu, P.R. China

2. Compal Information (Kunshan) Co., Ltd.

The Third Street, Kunshan Export Processing Zone, Jiangsu, P.R. China

3. Compal Information Technology (Kunshan) Co., Ltd.

No. 58, the 1st Street, Kunshan Export Processing Zone, Jiangsu, P.R. China

4. Compal Electronics Technology (Kunshan) Co., Ltd.

No. 25, The Third Street, Kunshan Export Processing Zone, Jiangsu, P.R. China

5. Kunshang Botai Electronics Co., Ltd.

No. 988, Tong Feng East Rd., Kunshan Economic & Technical Development Zone, Kunshan, Jiangsu, P.R. China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	WLAN Module
Brand Name	Acer, Gateway, PackardBell
Model Name	AR5B93
FCC ID	HLZ-AR5B93
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Channel Spacing	5 MHz
Maximum Output Power to Antenna	802.11b : 16.45 dBm (0.044 W) 802.11g : 17.34 dBm (0.054 W) 802.11n (BW 20MHz) : 16.97 dBm (0.050 W) 802.11n (BW 40MHz) : 17.54 dBm (0.057 W)
Antenna Type	Main Antenna : PIFA Antenna with gain -3.10 dBi Aux. Antenna : PIFA Antenna with gain -3.34 dBi
Host (Notebook Computer)	Brand Name : Acer, Gateway, PackardBell Model Name : KAVA0, KAV60, KAV80 Marketing Name : AOP150, AOP531, Aspire one, AOD210, AOD250, LT20, dot s, dot sr HW Version : LA-5141P (MB) SW Version : V1.01 (BIOS)
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

Remark: This test report recorded only product characteristics and test results of Digital Transmission System (DTS).

List of Accessory for Host (Notebook Computer):

Specification of Accessory		
AC Adapter	Brand Name	HIPRO
	Model Name	HP-A0301R3
	Power Rating	I/P:100-240Vac, 50-60Hz, 1000mA; O/P: 19Vdc, 1.58A, 30W
	AC Power Cord Type	1.5 meter shielded cable without ferrite core
Battery	Brand Name	Panasonic
	Model Name	UM08A51
	Power Rating	10.8Vdc, 2200mAh, 23Wh
	Type	Li-ion

Remark: The above information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description of the host (Notebook Computer).

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH06HY	TW1022/4086B-1

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 (Measurement Guidelines of DTS)
- ANSI C63.4-2003
- IC RSS-210 Issue 7

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
4.	Earphone	Kolin	Kit-7460E	FCC DoC	Unshielded, 1.6 m	N/A
5.	i-Pod	Apple	A1236	FCC DoC	Shielded, 1.0 m	N/A
6.	i-Pod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Output Power

Channel	Frequency (MHz)	802.11b RF Power (dBm)		
		Data Rate: 1Mbps		
		Chain A	Chain B	Chain A+B
CH 01	2412 MHz	13.91	12.91	16.45
CH 06	2437 MHz	13.37	13.29	16.34
CH 11	2462 MHz	12.97	12.93	15.96

Channel	Frequency (MHz)	802.11g RF Power (dBm)		
		Data Rate: 6Mbps		
		Chain A	Chain B	Chain A+B
CH 01	2412 MHz	11.48	10.34	13.96
CH 06	2437 MHz	14.24	14.42	17.34
CH 11	2462 MHz	10.53	10.95	13.76

Channel	Frequency (MHz)	802.11n (BW 20MHz) RF Power (dBm)		
		Data Rate: 6.5Mbps		
		Chain A	Chain B	Chain A+B
CH 01	2412 MHz	9.65	10.51	13.11
CH 06	2437 MHz	14.12	13.80	16.97
CH 11	2462 MHz	10.34	10.04	13.20

Channel	Frequency (MHz)	802.11n (BW 40MHz) RF Power (dBm)		
		Data Rate: 13.5Mbps		
		Chain A	Chain B	Chain A+B
CH 03	2422 MHz	8.76	8.73	11.76
CH 06	2437 MHz	14.54	14.51	17.54
CH 09	2452 MHz	9.76	9.45	12.62

Remark: The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

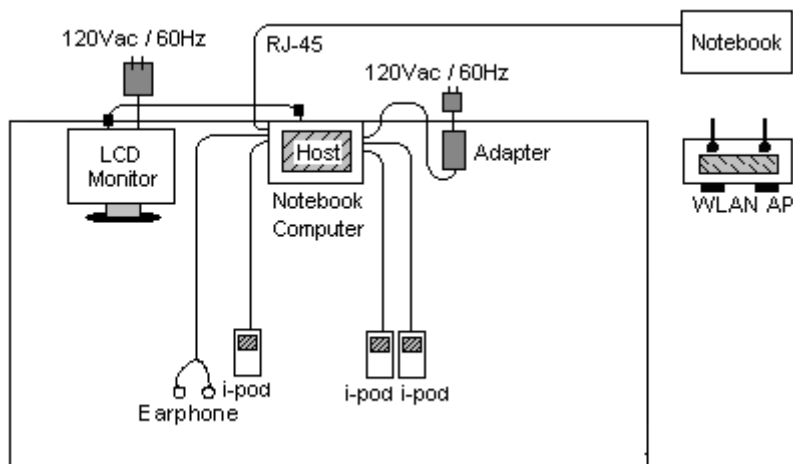
Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

The following table is showing the total pre-scanned test modes, and the worst modes are recorded in this report only.

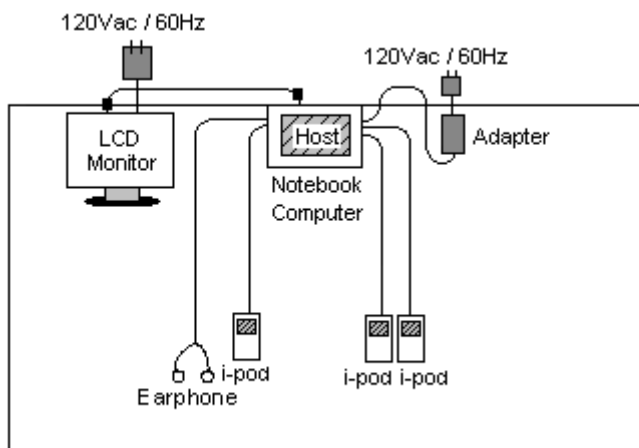
Test Cases	
Test Item	802.11b (Modulation : DSSS) 802.11g/n (Modulation : OFDM)
Radiated TCs	Mode 1: 802.11b_CH01_2412 MHz Mode 2: 802.11b_CH06_2437 MHz Mode 3: 802.11b_CH11_2462 MHz Mode 4: 802.11g_CH01_2412 MHz Mode 5: 802.11g_CH06_2437 MHz Mode 6: 802.11g_CH11_2462 MHz Mode 7: 802.11n_CH01_2412 MHz (BW 20MHz) Mode 8: 802.11n_CH06_2437 MHz (BW 20MHz) Mode 9: 802.11n_CH11_2462 MHz (BW 20MHz) Mode 10: 802.11n_CH03_2442 MHz (BW 40MHz) Mode 11: 802.11n_CH06_2437 MHz (BW 40MHz) Mode 12: 802.11n_CH09_2452 MHz (BW 40MHz)
AC Conducted Emission	Mode 1 : WLAN Link + TC
Remark: 1. TC stands for Test Configuration, and consists of adapter, i-Pod, LCD monitor, earphone, and RJ-45. 2. Only the radiated emission and conducted emission tests of the WLAN Module on this Notebook Computer was performed in this report and the conducted test cases can be referred to the integrated WLAN module (Brand Name: Atheros / Model Name: AR5B93 / FCC ID: PPD-AR5B93) report.	

2.3 Connection Diagram of Test System

<Conducted Emission Test>



<Radiated Emission Test>



Note: The EUT is a WLAN module which was installed into the host Notebook Computer (Brand Name: Acer, Gateway, PackardBell, Model Name: KAVA0, KAV60, KAV80, Marketing Name: AOP150, AOP531, Aspire one, AOD210, AOD250, LT20, dot s, dot sr) during the test.

2.4 RF Utility

The programmed RF utility "Command Prompt" is installed in host notebook computer to provide channel selection, power level, data rate and the application type. RF utility can send transmitting signal for all testing. 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.

3 Test Result

3.1 Band Edges Measurement

3.1.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB.

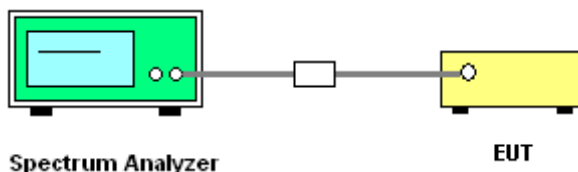
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.4-2003 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Conducted emission test: Set RBW = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic. Band edge emissions must be at least 20 dB below the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the output power of this device was measured by power meter, the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Apply to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep=Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation as in FCC Section 15.35(b) and (c).

3.1.4 Test Setup





3.1.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	26~27°C
Test Band :	802.11b	Relative Humidity :	43~44%
Test Channel :	01	Test Engineer :	Elvis Chen

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	49.77	-24.23	74.00	50.15	31.98	3.92	36.28	100	359	Peak
2389.61	37.91	-16.09	54.00	38.29	31.98	3.92	36.28	100	359	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	47.47	-26.53	74.00	47.85	31.98	3.92	36.28	102	355	Peak
2389.61	34.25	-19.75	54.00	34.63	31.98	3.92	36.28	102	355	Average

Test Mode :	Mode 3	Temperature :	26~27°C
Test Band :	802.11b	Relative Humidity :	43~44%
Test Channel :	11	Test Engineer :	Elvis Chen

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.85	49.34	-24.66	74.00	49.51	32.08	4.05	36.30	100	353	Peak
2483.85	37.10	-16.90	54.00	37.27	32.08	4.05	36.30	100	353	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2488.98	50.15	-23.85	74.00	50.30	32.10	4.05	36.30	100	309	Peak
2488.98	34.31	-19.69	54.00	34.46	32.10	4.05	36.30	100	309	Average



Test Mode :	Mode 4	Temperature :	26~27°C
Test Band :	802.11g	Relative Humidity :	43~44%
Test Channel :	01	Test Engineer :	Elvis Chen

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	58.73	-15.27	74.00	59.11	31.98	3.92	36.28	100	359	Peak
2389.99	41.12	-12.88	54.00	41.50	31.98	3.92	36.28	100	359	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	56.35	-17.65	74.00	56.73	31.98	3.92	36.28	100	355	Peak
2389.99	38.31	-15.69	54.00	38.69	31.98	3.92	36.28	100	355	Average

Test Mode :	Mode 6	Temperature :	26~27°C
Test Band :	802.11g	Relative Humidity :	43~44%
Test Channel :	11	Test Engineer :	Elvis Chen

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	58.32	-15.68	74.00	58.49	32.08	4.05	36.30	175	13	Peak
2483.50	41.73	-12.27	54.00	41.90	32.08	4.05	36.30	175	13	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	56.54	-17.46	74.00	56.71	32.08	4.05	36.30	100	357	Peak
2483.50	38.90	-15.10	54.00	39.07	32.08	4.05	36.30	100	357	Average



Test Mode :	Mode 7	Temperature :	26~27°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	43~44%
Test Channel :	01	Test Engineer :	Elvis Chen

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	60.64	-13.36	74.00	61.02	31.98	3.92	36.28	100	359	Peak
2389.99	40.86	-13.14	54.00	41.24	31.98	3.92	36.28	100	359	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	56.65	-17.35	74.00	57.03	31.98	3.92	36.28	100	355	Peak
2389.99	37.52	-16.48	54.00	37.90	31.98	3.92	36.28	100	355	Average

Test Mode :	Mode 9	Temperature :	26~27°C
Test Band :	802.11n (BW 20MHz)	Relative Humidity :	43~44%
Test Channel :	11	Test Engineer :	Elvis Chen

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	56.54	-17.46	74.00	56.71	32.08	4.05	36.30	100	12	Peak
2483.50	41.71	-12.29	54.00	41.88	32.08	4.05	36.30	100	12	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.42	57.94	-16.06	74.00	58.11	32.08	4.05	36.30	100	359	Peak
2484.42	38.75	-15.25	54.00	38.92	32.08	4.05	36.30	100	359	Average



Test Mode :	Mode 10	Temperature :	26~27°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	43~44%
Test Channel :	03	Test Engineer :	Elvis Chen

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.42	59.88	-14.12	74.00	60.26	31.98	3.92	36.28	100	0	Peak
2389.42	40.39	-13.61	54.00	40.77	31.98	3.92	36.28	100	0	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.99	56.94	-17.06	74.00	57.32	31.98	3.92	36.28	100	357	Peak
2389.99	37.46	-16.54	54.00	37.84	31.98	3.92	36.28	100	357	Average

Test Mode :	Mode 12	Temperature :	26~27°C
Test Band :	802.11n (BW 40MHz)	Relative Humidity :	43~44%
Test Channel :	09	Test Engineer :	Elvis Chen

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	64.38	-9.62	74.00	64.55	32.08	4.05	36.30	100	14	Peak
2483.50	44.51	-9.49	54.00	44.68	32.08	4.05	36.30	100	14	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.50	60.90	-13.10	74.00	61.07	32.08	4.05	36.30	100	356	Peak
2483.50	42.58	-11.42	54.00	42.75	32.08	4.05	36.30	100	356	Average

3.2 AC Conducted Emission Measurement

3.2.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

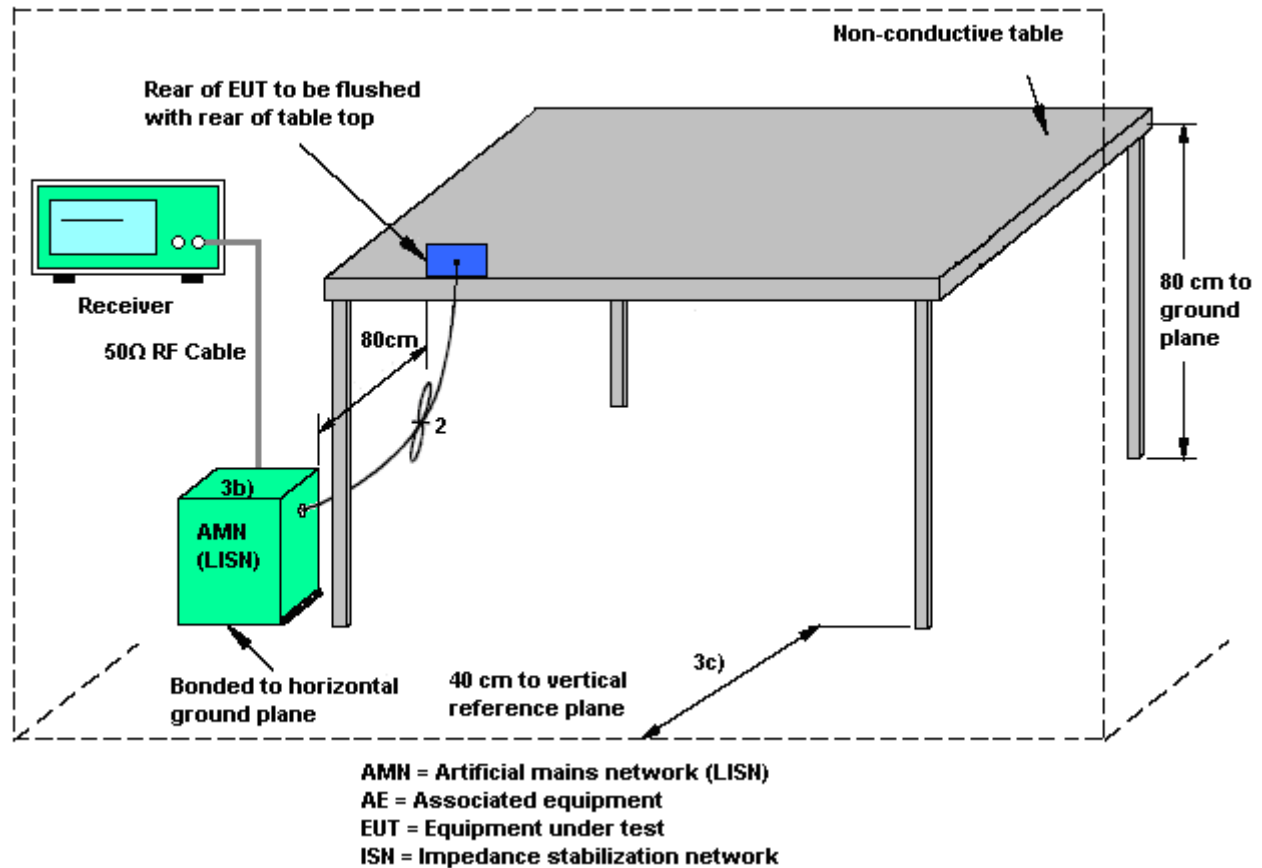
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

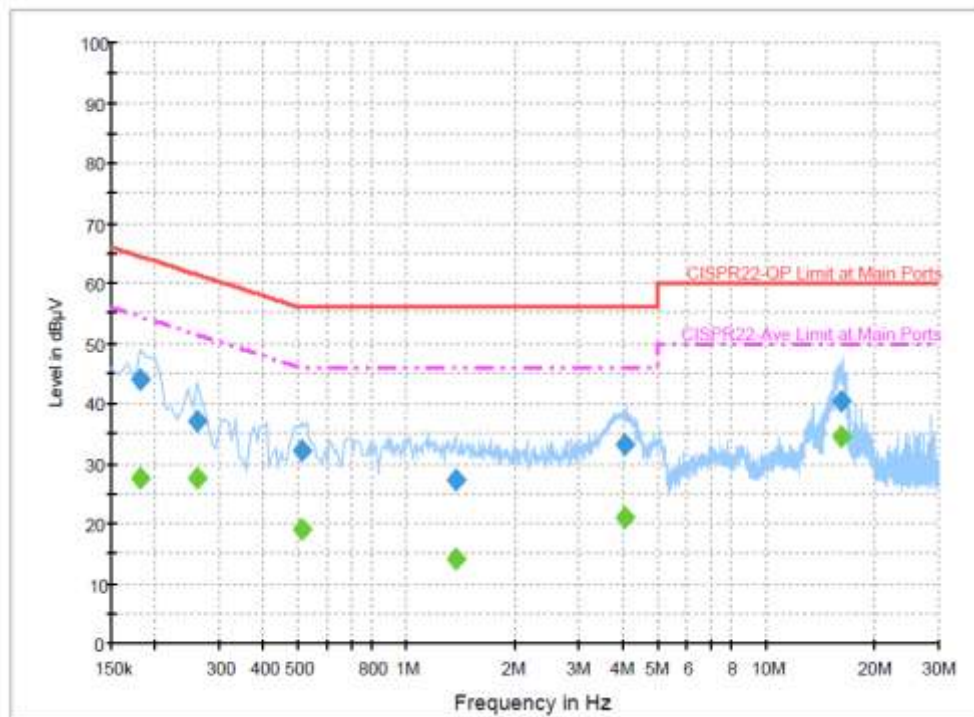
1. The testing follows the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.2.4 Test Setup



3.2.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	23~24℃
Test Engineer :	Cona Huang	Relative Humidity :	42~43%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + TC		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



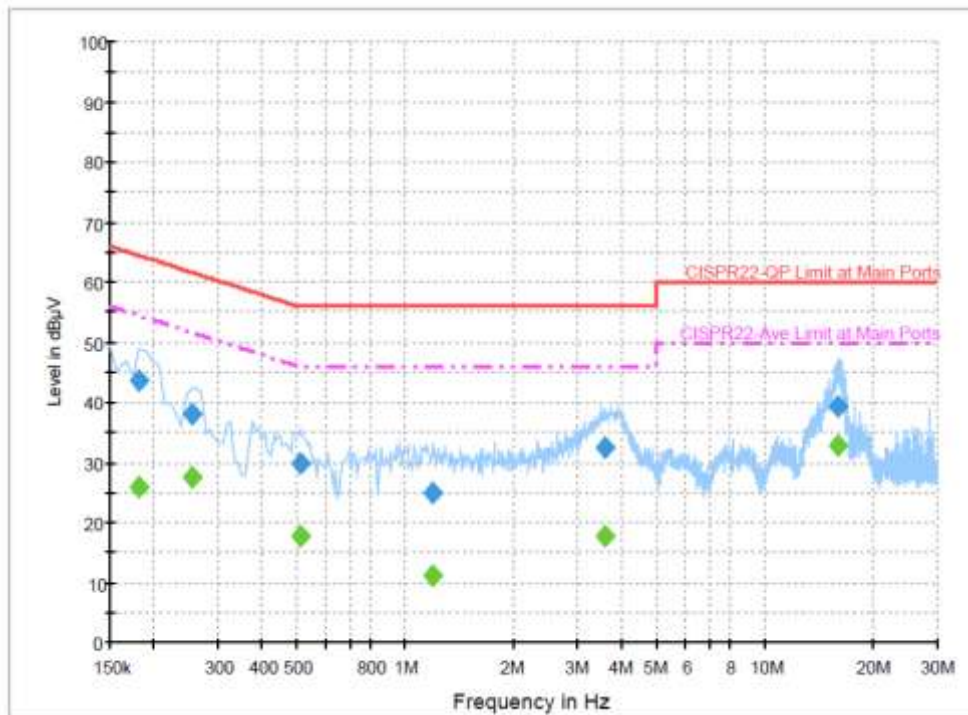
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	43.8	Off	L1	19.5	20.6	64.4
0.262000	37.0	Off	L1	19.4	24.4	61.4
0.510000	32.2	Off	L1	19.5	23.8	56.0
1.358000	27.2	Off	L1	19.5	28.8	56.0
4.030000	33.0	Off	L1	19.5	23.0	56.0
16.102000	40.3	Off	L1	19.7	19.7	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	27.7	Off	L1	19.5	26.7	54.4
0.262000	27.6	Off	L1	19.4	23.8	51.4
0.510000	19.1	Off	L1	19.5	26.9	46.0
1.358000	14.1	Off	L1	19.5	31.9	46.0
4.030000	21.0	Off	L1	19.5	25.0	46.0
16.102000	34.3	Off	L1	19.7	15.7	50.0

Test Mode :	Mode 1	Temperature :	23~24°C
Test Engineer :	Cona Huang	Relative Humidity :	42~43%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + TC		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	43.7	Off	N	19.5	20.7	64.4
0.254000	38.0	Off	N	19.4	23.6	61.6
0.510000	29.9	Off	N	19.6	26.1	56.0
1.190000	25.0	Off	N	19.5	31.0	56.0
3.582000	32.6	Off	N	19.5	23.4	56.0
15.830000	39.5	Off	N	19.8	20.5	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	26.0	Off	N	19.5	28.4	54.4
0.254000	27.4	Off	N	19.4	24.2	51.6
0.510000	17.7	Off	N	19.6	28.3	46.0
1.190000	11.3	Off	N	19.5	34.7	46.0
3.582000	17.8	Off	N	19.5	28.2	46.0
15.830000	32.8	Off	N	19.8	17.2	50.0

3.3 Radiated Emission Measurement

3.3.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

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

3.3.2 Measuring Instruments

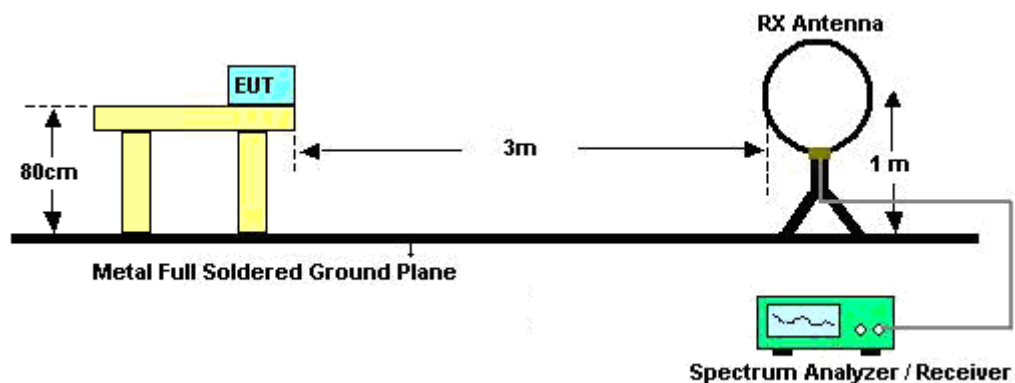
See list of measuring instruments of this test report.

3.3.3 Test Procedures

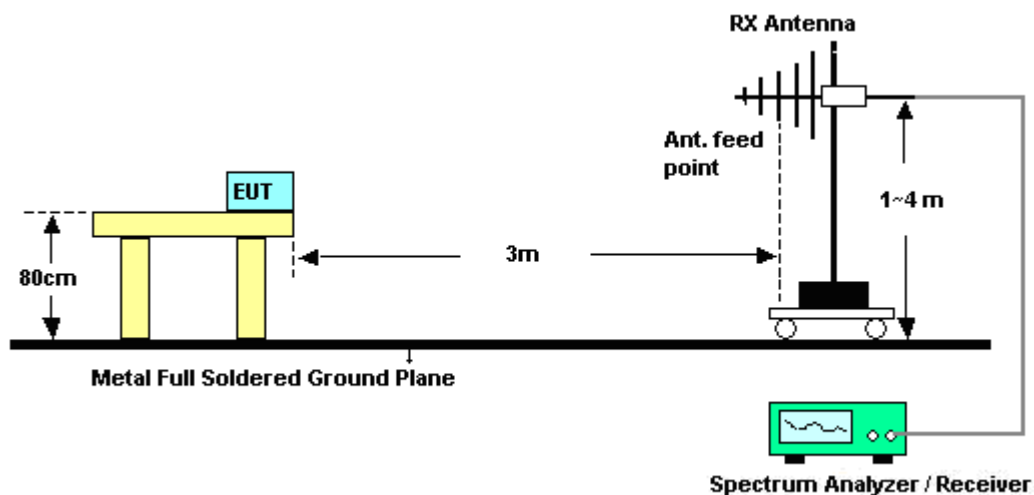
1. The testing follows the guidelines in FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

3.3.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



**3.3.5 Test Results of Radiated Emissions (9kHz ~ 30MHz)**

Test Engineer :	Elvis Chen	Temperature :	26~27°C	
		Relative Humidity :	43~44%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

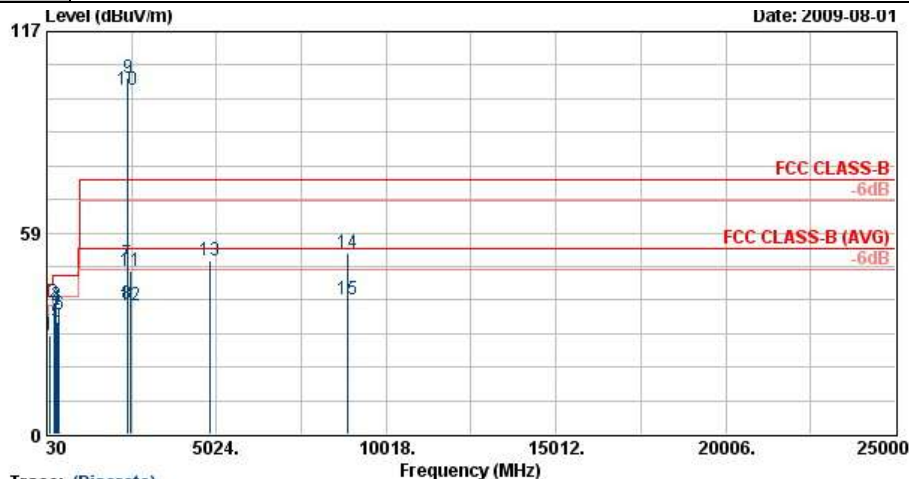
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

3.3.6 Test Result of Radiated Emission (30MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



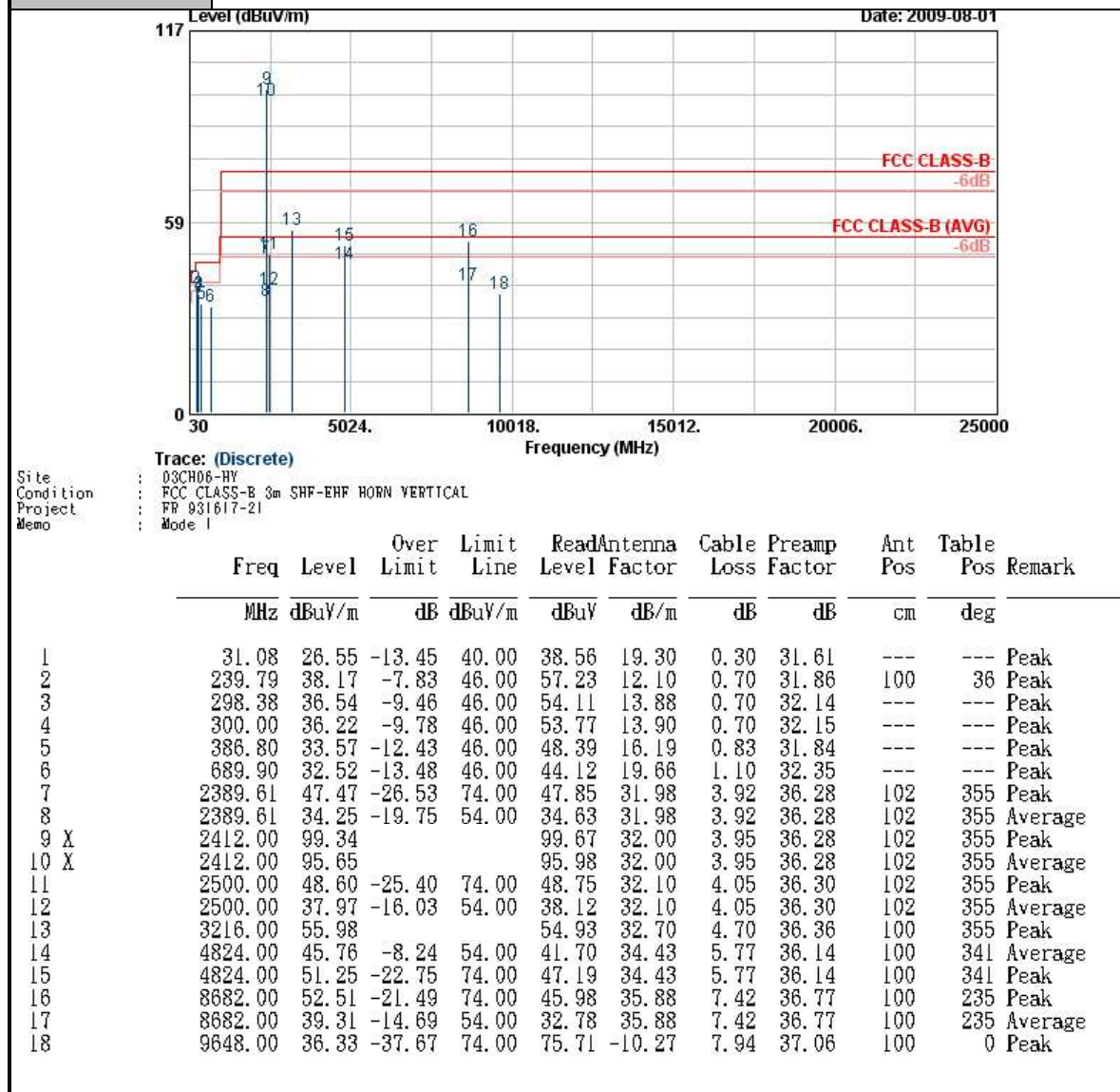
Trace: (Discrete)

Site : 03CH06-HV
Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
Project : FR 931617-21
Demo : Mode 1

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	99.39	28.81	-14.69	43.50	48.95	11.40	0.50	32.04	---	---	Peak
2	239.79	38.49	-7.51	46.00	57.55	12.10	0.70	31.86	100	126	Peak
3	299.73	37.23	-8.77	46.00	54.78	13.90	0.70	32.15	---	---	Peak
4	300.00	36.69	-9.31	46.00	54.24	13.90	0.70	32.15	---	---	Peak
5	325.90	32.61	-13.39	46.00	49.09	14.63	0.80	31.91	---	---	Peak
6	388.90	34.75	-11.25	46.00	49.54	16.24	0.81	31.85	---	---	Peak
7	2389.61	49.77	-24.23	74.00	50.15	31.98	3.92	36.28	100	359	Peak
8	2389.61	37.91	-16.09	54.00	38.29	31.98	3.92	36.28	100	359	Average
9 X	2412.00	103.32			103.65	32.00	3.95	36.28	100	359	Peak
10 @	2412.00	100.01			100.34	32.00	3.95	36.28	100	359	Average
11	2494.00	47.27	-26.73	74.00	47.42	32.10	4.05	36.30	100	359	Peak
12	2494.00	37.23	-16.77	54.00	37.38	32.10	4.05	36.30	100	359	Average
13	4824.00	50.32	-23.68	74.00	46.26	34.43	5.77	36.14	100	352	Peak
14	8886.00	52.59	-21.41	74.00	45.67	36.08	7.68	36.85	100	159	Peak
15	8886.00	39.30	-14.70	54.00	32.38	36.08	7.68	36.85	100	159	Average

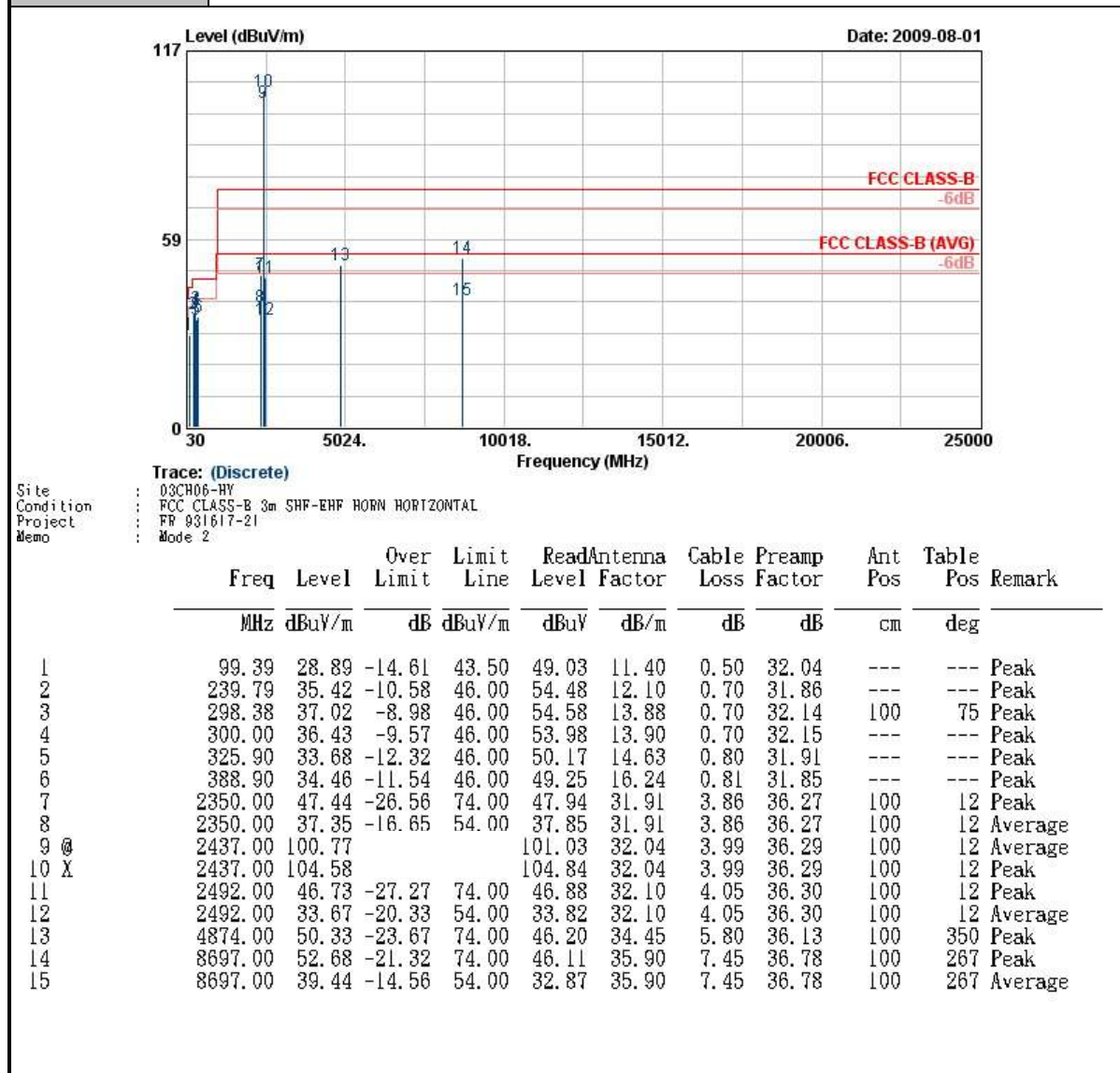


Test Mode :	Mode 1	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		



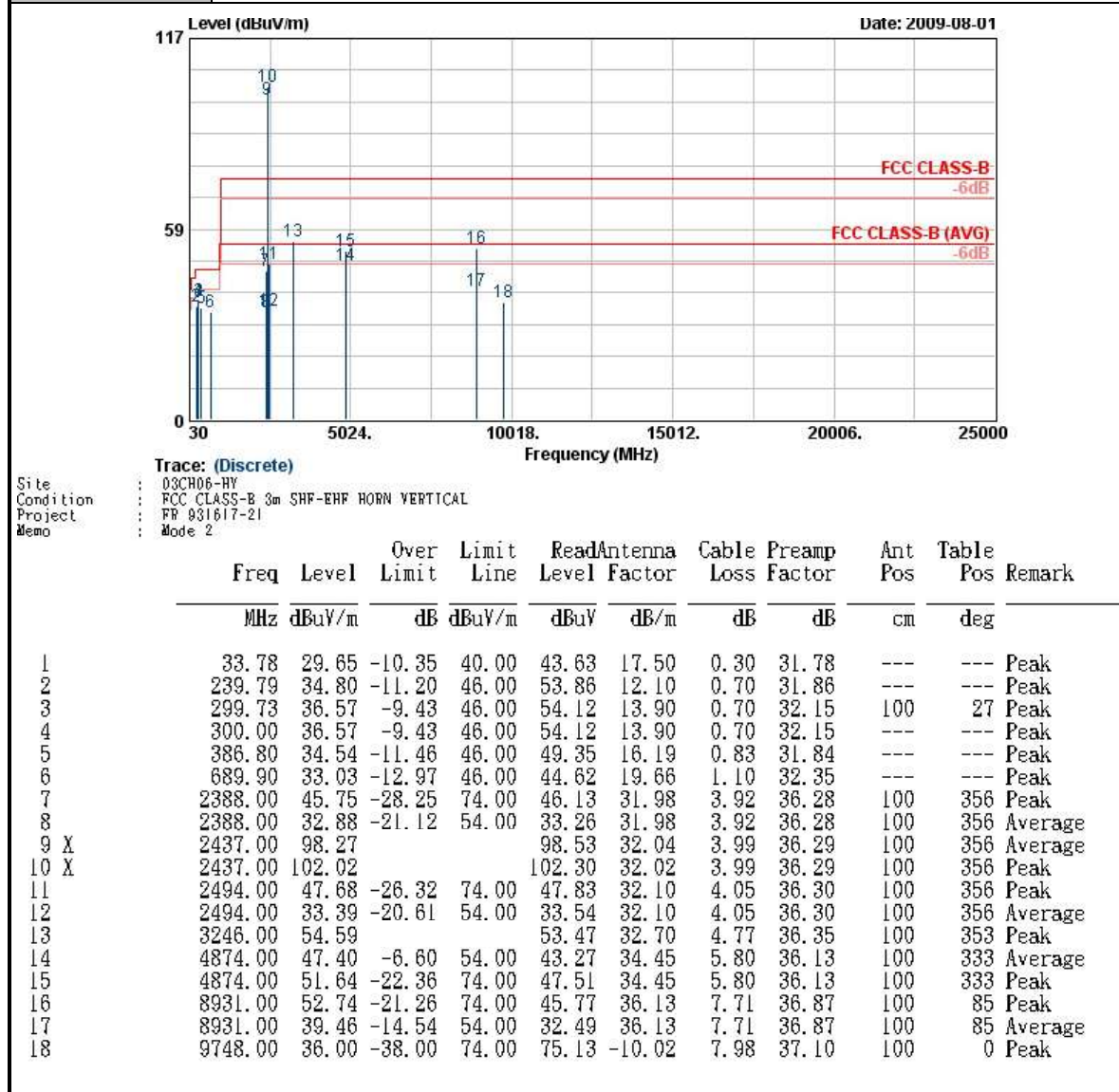


Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		





Test Mode :	Mode 2	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		

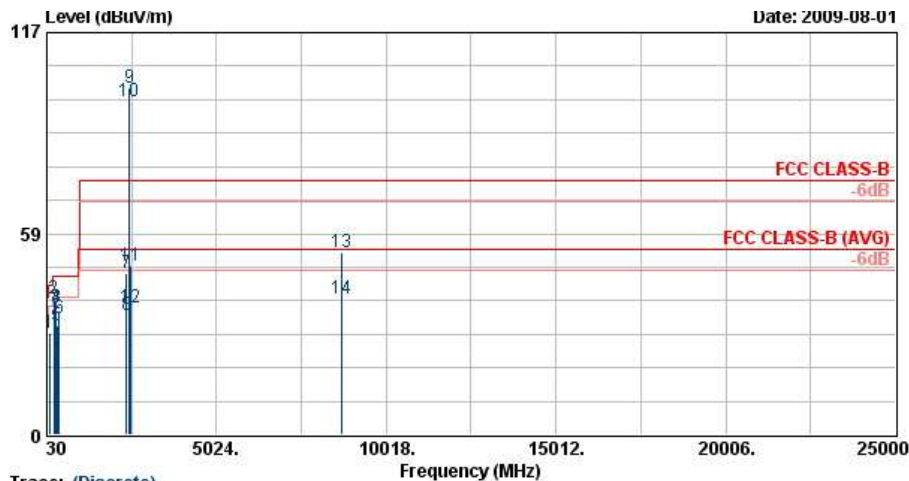




FCC RF Test Report

Report No. : FR931617-21

Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



Trace: (Discrete)

Frequency (MHz)

Site : 03CH06-HY

Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL

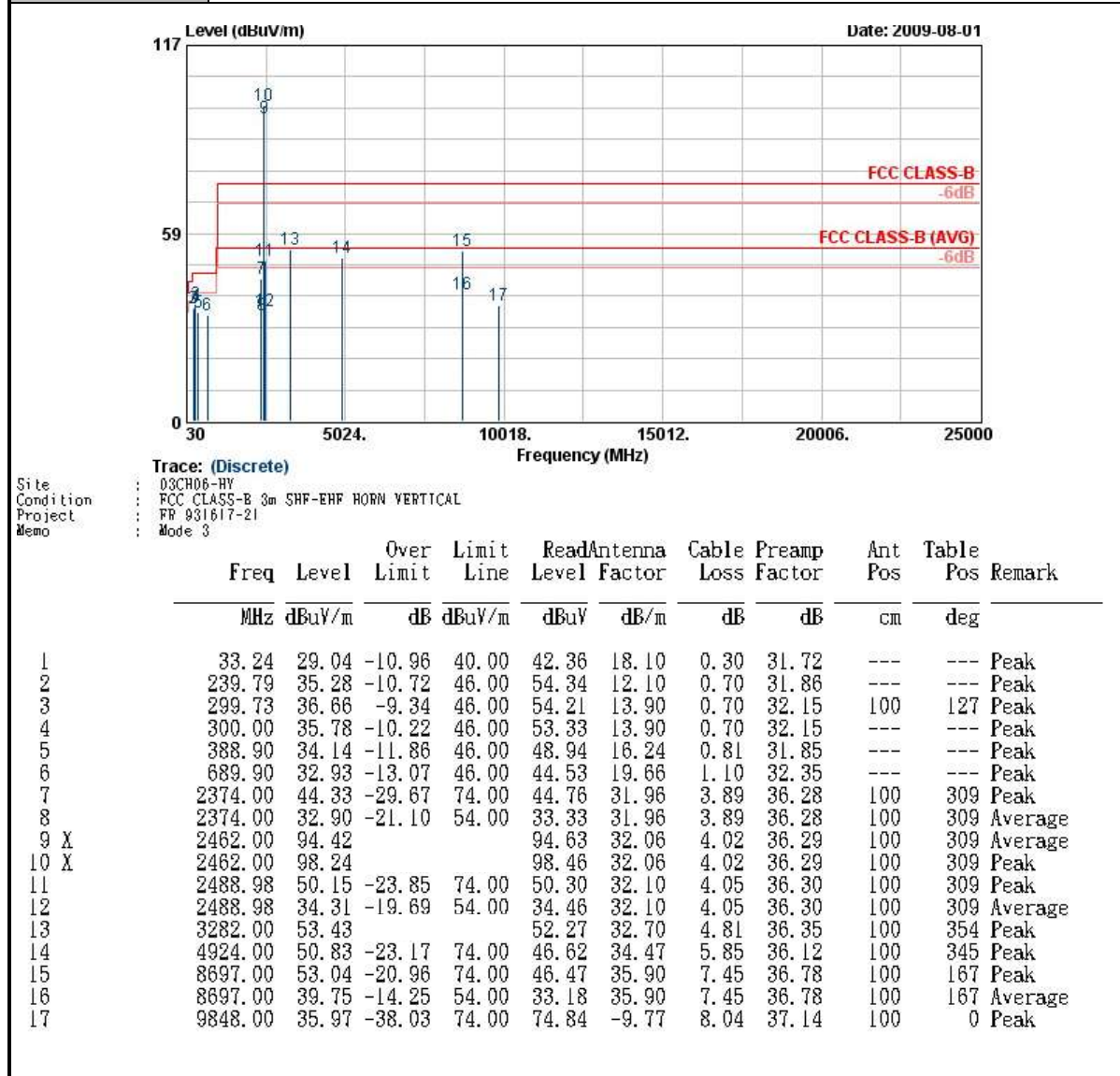
Project : FR 931617-21

Memo : Mode 3

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	99.93	29.37	-14.13	43.50	49.51	11.40	0.50	32.04	---	---	Peak
2	239.79	39.58	-6.42	46.00	58.64	12.10	0.70	31.86	100	73	Peak
3	299.73	36.86	-9.14	46.00	54.41	13.90	0.70	32.15	---	---	Peak
4	300.00	36.81	-9.19	46.00	54.36	13.90	0.70	32.15	---	---	Peak
5	325.90	31.80	-14.20	46.00	48.29	14.63	0.80	31.91	---	---	Peak
6	390.30	33.78	-12.22	46.00	48.57	16.26	0.80	31.85	---	---	Peak
7	2380.00	47.12	-26.88	74.00	47.52	31.96	3.92	36.28	100	353	Peak
8	2380.00	34.86	-19.14	54.00	35.26	31.96	3.92	36.28	100	353	Average
9 X	2462.00	100.82			101.04	32.06	4.02	36.30	100	353	Peak
10 @	2462.00	97.13			97.34	32.06	4.02	36.29	100	353	Average
11	2483.85	49.34	-24.66	74.00	49.51	32.08	4.05	36.30	100	353	Peak
12	2483.85	37.10	-16.90	54.00	37.27	32.08	4.05	36.30	100	353	Average
13	8697.00	52.92	-21.08	74.00	46.36	35.90	7.45	36.78	100	38	Peak
14	8697.00	39.66	-14.34	54.00	33.09	35.90	7.45	36.78	100	38	Average

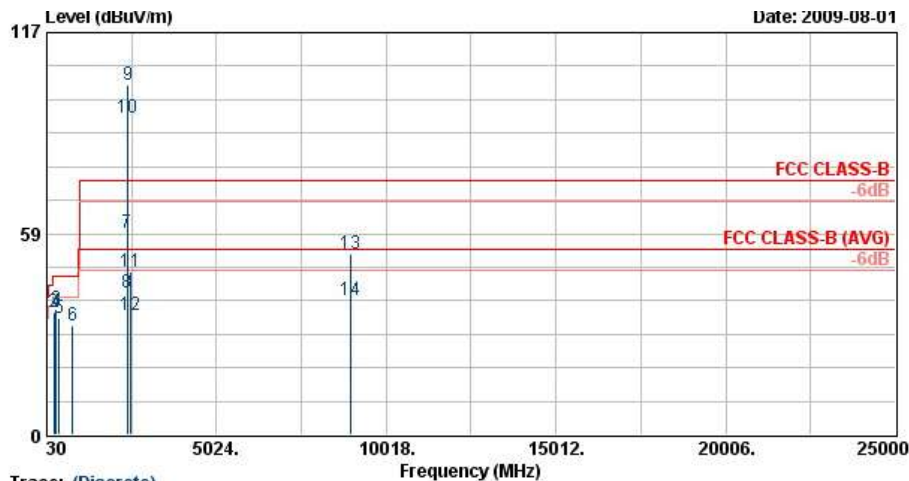


Test Mode :	Mode 3	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		





Test Mode :	Mode 4	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



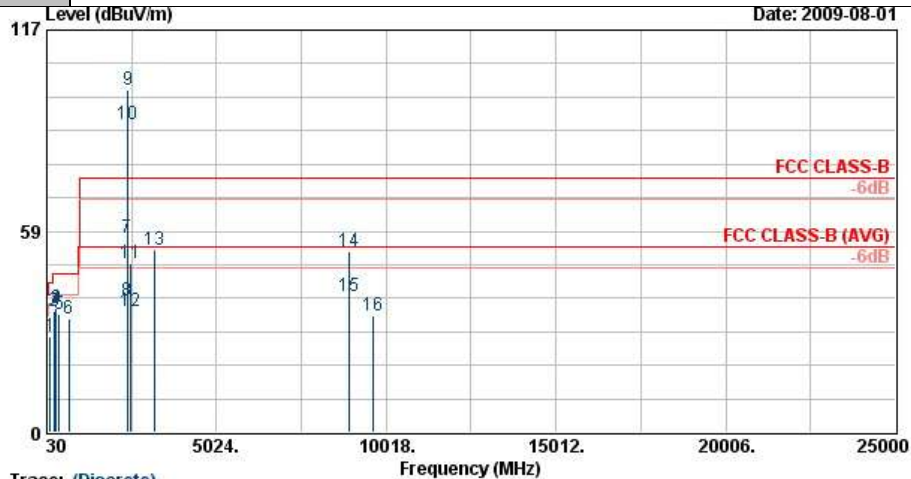
Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
Project : FR 931617-21
Memo : Mode 4

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	37.29	28.47	-11.53	40.00	44.81	15.10	0.30	31.75	---	---	Peak
2	239.79	35.79	-10.21	46.00	54.85	12.10	0.70	31.86	---	---	Peak
3	299.73	36.60	-9.40	46.00	54.15	13.90	0.70	32.15	100	77	Peak
4	300.00	35.64	-10.36	46.00	53.19	13.90	0.70	32.15	---	---	Peak
5	386.80	34.07	-11.93	46.00	48.89	16.19	0.83	31.84	---	---	Peak
6	782.30	31.72	-14.28	46.00	42.03	20.63	1.20	32.14	---	---	Peak
7	2389.99	58.73	-15.27	74.00	59.11	31.98	3.92	36.28	100	359	Peak
8	2389.99	41.12	-12.88	54.00	41.50	31.98	3.92	36.28	100	359	Average
9 X	2412.00	101.96			102.29	32.00	3.95	36.28	100	359	Peak
10 @	2412.00	92.06			92.39	32.00	3.95	36.28	100	359	Average
11	2500.00	47.42	-26.58	74.00	47.57	32.10	4.05	36.30	100	359	Peak
12	2500.00	34.85	-19.15	54.00	35.00	32.10	4.05	36.30	100	359	Average
13	8961.00	52.54	-21.46	74.00	45.50	36.15	7.77	36.88	100	125	Peak
14	8961.00	39.23	-14.77	54.00	32.19	36.15	7.77	36.88	100	125	Average



Test Mode :	Mode 4	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		



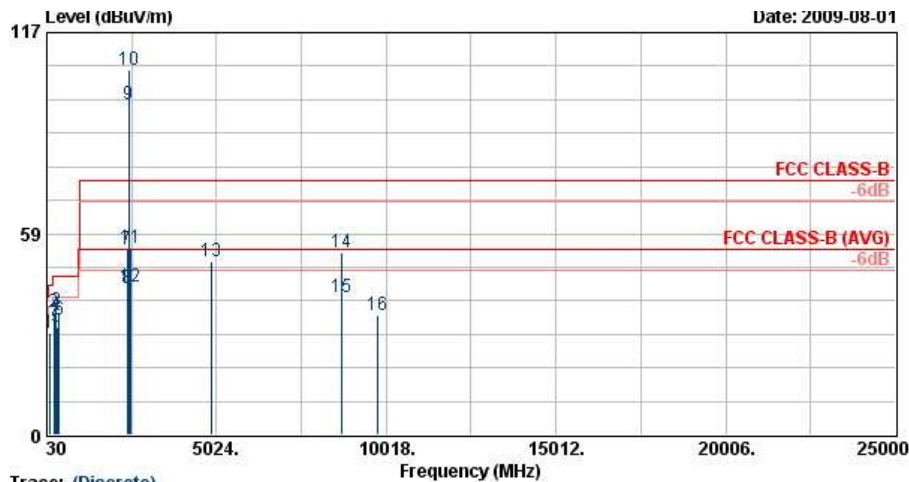
Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
Project : FR 931617-21
Memo : Mode 4

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	130.44	28.04	-15.46	43.50	46.99	12.25	0.50	31.69	---	---	Peak
2	239.79	35.09	-10.91	46.00	54.15	12.10	0.70	31.86	---	---	Peak
3	298.38	36.18	-9.82	46.00	53.74	13.88	0.70	32.14	100	44	Peak
4	300.00	35.45	-10.55	46.00	53.00	13.90	0.70	32.15	---	---	Peak
5	390.30	34.32	-11.68	46.00	49.11	16.26	0.80	31.85	---	---	Peak
6	689.90	33.00	-13.00	46.00	44.60	19.66	1.10	32.35	---	---	Peak
7	2389.99	56.35	-17.65	74.00	56.73	31.98	3.92	36.28	100	355	Peak
8	2389.99	38.31	-15.69	54.00	38.69	31.98	3.92	36.28	100	355	Average
9 X	2412.00	99.76			100.10	32.00	3.95	36.28	100	355	Peak
10 X	2412.00	89.42			89.75	32.00	3.95	36.28	100	355	Average
11	2500.00	49.00	-25.00	74.00	49.15	32.10	4.05	36.30	100	355	Peak
12	2500.00	35.40	-18.60	54.00	35.55	32.10	4.05	36.30	100	355	Average
13	3216.00	53.09			52.04	32.70	4.70	36.36	100	352	Peak
14	8931.00	52.69	-21.31	74.00	45.72	36.13	7.71	36.87	100	85	Peak
15	8931.00	39.51	-14.49	54.00	32.54	36.13	7.71	36.87	100	85	Average
16	9648.00	33.86	-40.14	74.00	73.24	-10.27	7.94	37.06	100	0	Peak



Test Mode :	Mode 5	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		

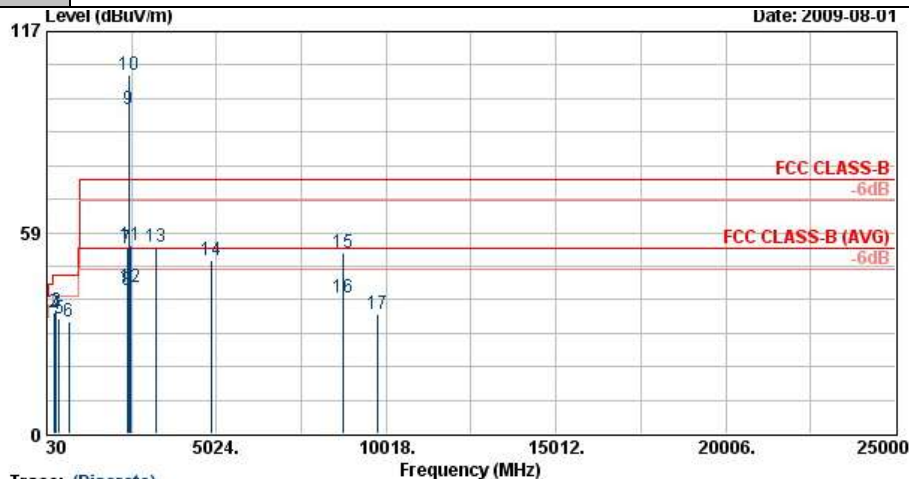


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
 Project : FR 931617-21
 Memo : Mode 5

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	99.93	29.47	-14.03	43.50	49.61	11.40	0.50	32.04	---	---	Peak
2	239.79	35.82	-10.18	46.00	54.88	12.10	0.70	31.86	---	---	Peak
3	298.38	36.09	-9.91	46.00	53.65	13.88	0.70	32.14	100	107	Peak
4	300.00	34.95	-11.05	46.00	52.50	13.90	0.70	32.15	---	---	Peak
5	325.90	31.32	-14.68	46.00	47.80	14.63	0.80	31.91	---	---	Peak
6	390.30	33.44	-12.56	46.00	48.22	16.26	0.80	31.85	---	---	Peak
7	2390.00	53.90	-20.10	74.00	54.28	31.98	3.92	36.28	176	359	Peak
8	2390.00	42.71	-11.29	54.00	43.09	31.98	3.92	36.28	176	359	Average
9 @	2437.00	95.97			96.23	32.04	3.99	36.29	176	359	Average
10 X	2437.00	106.14			106.42	32.02	3.99	36.29	176	359	Peak
11	2484.00	54.53	-19.47	74.00	54.69	32.08	4.05	36.30	176	359	Peak
12	2484.00	42.99	-11.01	54.00	43.16	32.08	4.05	36.30	176	359	Average
13	4874.00	50.42	-23.58	74.00	46.30	34.45	5.80	36.13	100	351	Peak
14	8691.00	52.98	-21.02	74.00	46.46	35.88	7.42	36.78	100	42	Peak
15	8691.00	39.81	-14.19	54.00	33.29	35.88	7.42	36.78	100	42	Average
16	9748.00	34.81	-39.19	74.00	73.94	-10.02	7.98	37.10	100	0	Peak



Test Mode :	Mode 5	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		

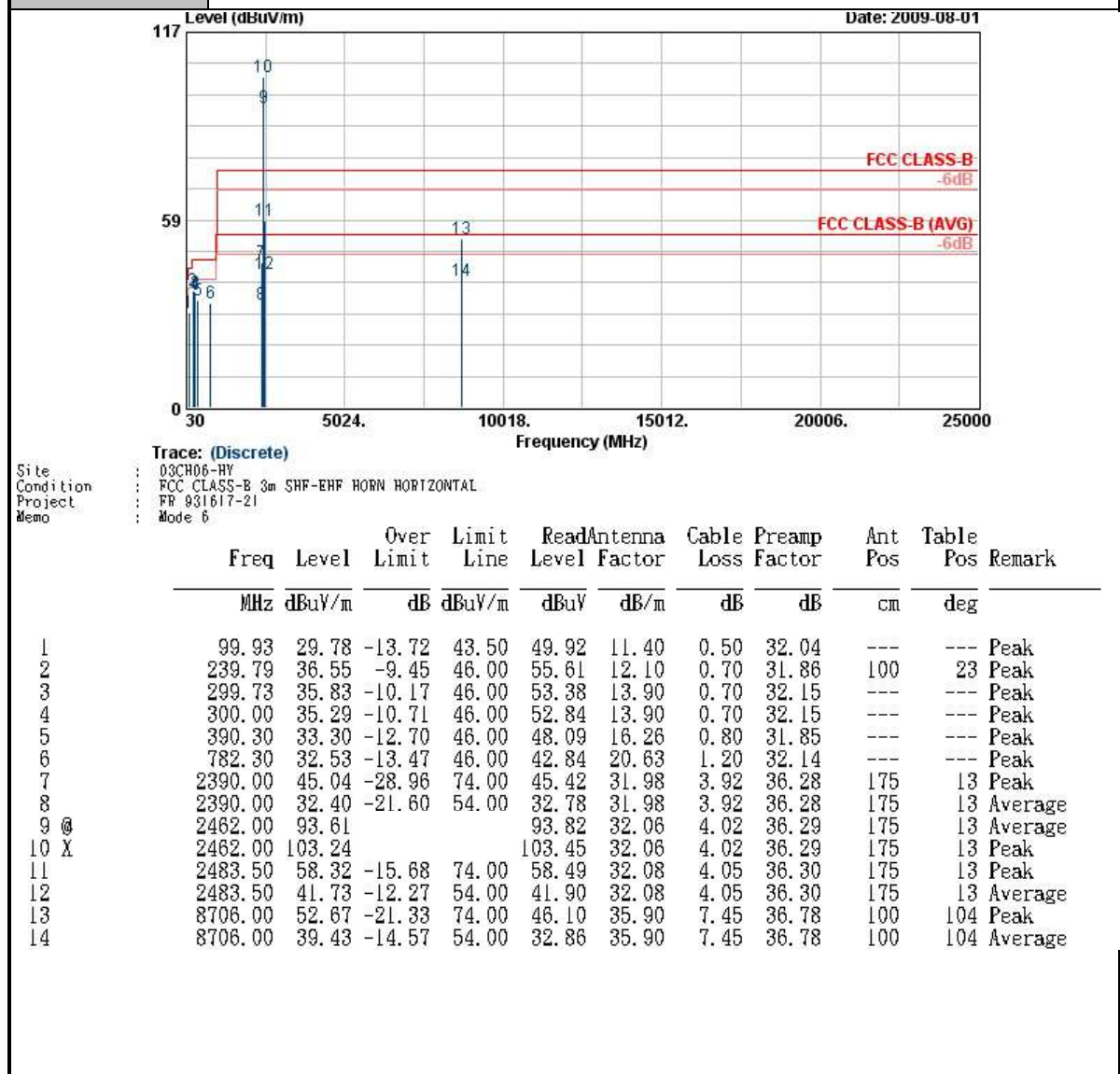


Site : 03CH06-HY
Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
Project : FR 931617-21
Memo : Mode 5

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	33.78	29.66	-10.34	40.00	43.64	17.50	0.30	31.78	100	352	Peak
2	239.79	35.26	-10.74	46.00	54.32	12.10	0.70	31.86	---	---	Peak
3	299.73	35.58	-10.42	46.00	53.13	13.90	0.70	32.15	---	---	Peak
4	300.00	34.89	-11.11	46.00	52.44	13.90	0.70	32.15	---	---	Peak
5	390.30	33.56	-12.44	46.00	48.34	16.26	0.80	31.85	---	---	Peak
6	689.90	32.81	-13.19	46.00	44.41	19.66	1.10	32.35	---	---	Peak
7	2390.00	53.88	-20.12	74.00	54.27	31.98	3.92	36.28	100	357	Peak
8	2390.00	41.56	-12.44	54.00	41.94	31.98	3.92	36.28	100	357	Average
9 X	2437.00	94.57			94.83	32.04	3.99	36.29	100	357	Average
10 X	2437.00	104.53			104.80	32.04	3.99	36.29	100	357	Peak
11	2483.50	54.67	-19.33	74.00	54.83	32.08	4.05	36.30	100	357	Peak
12	2483.50	42.73	-11.27	54.00	42.90	32.08	4.05	36.30	100	357	Average
13	3246.00	54.18			53.06	32.70	4.77	36.35	100	352	Peak
14	4874.00	50.28	-23.72	74.00	46.16	34.45	5.80	36.13	100	356	Peak
15	8751.00	52.77	-21.23	74.00	46.12	35.95	7.50	36.80	100	134	Peak
16	8751.00	39.59	-14.41	54.00	32.94	35.95	7.50	36.80	100	134	Average
17	9748.00	34.99	-39.01	74.00	74.12	-10.02	7.98	37.10	100	0	Peak

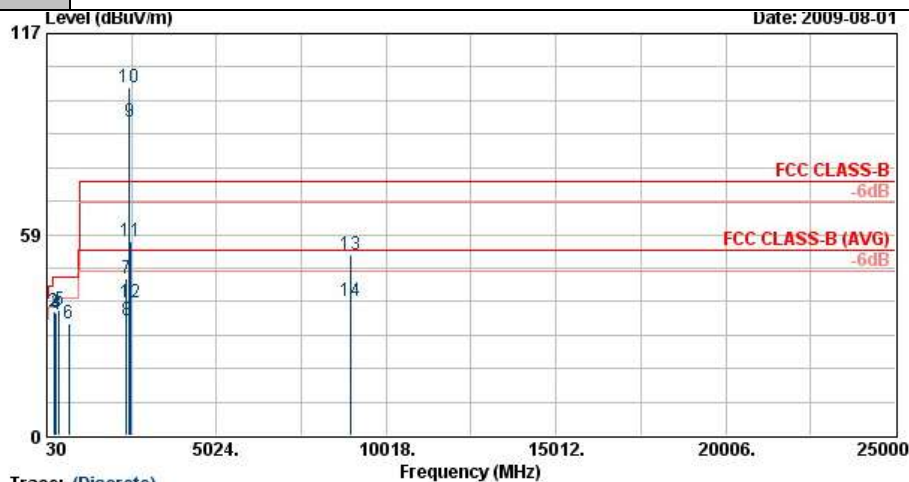


Test Mode :	Mode 6	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		





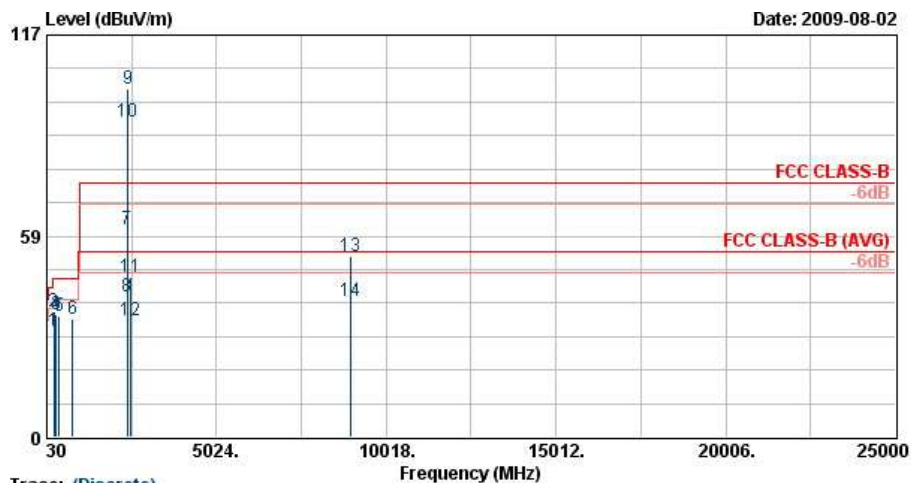
Test Mode :	Mode 6	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	33.78	28.13	-11.87	40.00	42.11	17.50	0.30	31.78	---	---	Peak
2	239.79	36.17	-9.83	46.00	55.23	12.10	0.70	31.86	---	---	Peak
3	298.38	35.79	-10.21	46.00	53.35	13.88	0.70	32.14	---	---	Peak
4	300.00	35.34	-10.66	46.00	52.89	13.90	0.70	32.15	---	---	Peak
5	390.30	36.48	-9.52	46.00	51.26	16.26	0.80	31.85	100	45	Peak
6	689.90	32.53	-13.47	46.00	44.12	19.66	1.10	32.35	---	---	Peak
7	2380.00	45.80	-28.20	74.00	46.20	31.96	3.92	36.28	100	357	Peak
8	2380.00	33.66	-20.34	54.00	34.06	31.96	3.92	36.28	100	357	Average
9 X	2462.00	91.51			91.72	32.06	4.02	36.29	100	357	Average
10 X	2462.00	101.17			101.39	32.06	4.02	36.30	100	357	Peak
11	2483.50	56.54	-17.46	74.00	56.71	32.08	4.05	36.30	100	357	Peak
12	2483.50	38.90	-15.10	54.00	39.07	32.08	4.05	36.30	100	357	Average
13	8952.00	52.50	-21.50	74.00	45.48	36.15	7.74	36.88	100	12	Peak
14	8952.00	39.28	-14.72	54.00	32.27	36.15	7.74	36.88	100	12	Average



Test Mode :	Mode 7	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



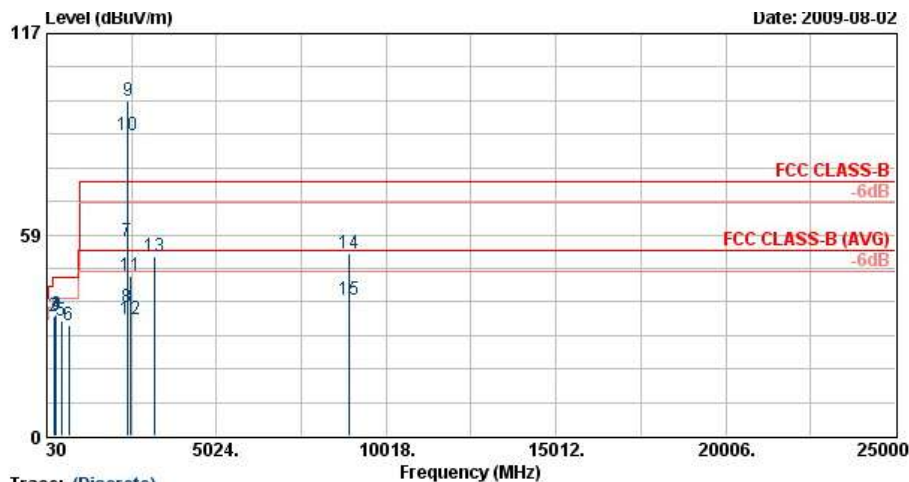
Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
Project : FR 931617-21
Memo : Mode 7

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	233.04	31.06	-14.94	46.00	50.86	11.47	0.70	31.97	---	---	Peak
2	239.79	36.37	-9.63	46.00	55.43	12.10	0.70	31.86	100	36	Peak
3	298.38	35.70	-10.30	46.00	53.26	13.88	0.70	32.14	---	---	Peak
4	300.00	35.67	-10.33	46.00	53.22	13.90	0.70	32.15	---	---	Peak
5	386.80	35.08	-10.92	46.00	49.90	16.19	0.83	31.84	---	---	Peak
6	782.30	34.28	-11.72	46.00	44.60	20.63	1.20	32.14	---	---	Peak
7	2389.99	60.64	-13.36	74.00	61.02	31.98	3.92	36.28	100	359	Peak
8	2389.99	40.86	-13.14	54.00	41.24	31.98	3.92	36.28	100	359	Average
9 X	2412.00	101.47			101.80	32.00	3.95	36.28	100	359	Peak
10 @	2412.00	91.65			91.98	32.00	3.95	36.28	100	359	Average
11	2494.00	46.58	-27.42	74.00	46.73	32.10	4.05	36.30	100	359	Peak
12	2494.00	33.81	-20.19	54.00	33.96	32.10	4.05	36.30	100	359	Average
13	8961.00	52.66	-21.34	74.00	45.62	36.15	7.77	36.88	100	73	Peak
14	8961.00	39.45	-14.55	54.00	32.41	36.15	7.77	36.88	100	73	Average



Test Mode :	Mode 7	Temperature :	26~27°C
Test Channel :	01	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		



Trace: (Discrete)

Site : D3CH06-HY
Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
Project : FR 931617-21
Memo : Mode 7

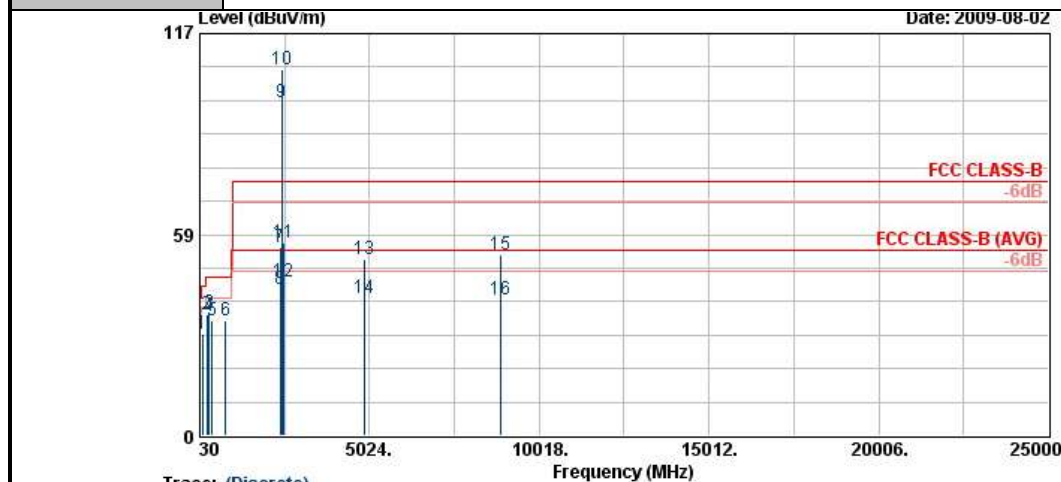
	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	33.78	29.46	-10.54	40.00	43.44	17.50	0.30	31.78	100	22	Peak
2	239.79	34.90	-11.10	46.00	53.96	12.10	0.70	31.86	---	---	Peak
3	298.38	35.21	-10.79	46.00	52.77	13.88	0.70	32.14	---	---	Peak
4	300.00	35.18	-10.82	46.00	52.73	13.90	0.70	32.15	---	---	Peak
5	449.80	33.66	-12.34	46.00	47.60	17.20	0.90	32.04	---	---	Peak
6	689.90	32.11	-13.89	46.00	43.71	19.66	1.10	32.35	---	---	Peak
7	2389.99	56.65	-17.35	74.00	57.03	31.98	3.92	36.28	100	355	Peak
8	2389.99	37.52	-16.48	54.00	37.90	31.98	3.92	36.28	100	355	Average
9 X	2412.00	97.29			97.62	32.00	3.95	36.28	100	355	Peak
10 X	2412.00	87.46			87.79	32.00	3.95	36.28	100	355	Average
11	2492.00	46.65	-27.35	74.00	46.80	32.10	4.05	36.30	100	355	Peak
12	2492.00	33.97	-20.03	54.00	34.12	32.10	4.05	36.30	100	355	Average
13	3216.00	52.31			51.26	32.70	4.70	36.36	100	352	Peak
14	8916.00	52.86	-21.14	74.00	45.90	36.12	7.71	36.86	100	43	Peak
15	8916.00	39.66	-14.34	54.00	32.69	36.12	7.71	36.86	100	43	Average



FCC RF Test Report

Report No. : FR931617-21

Test Mode :	Mode 8	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



Site
Condition
Project
Memo

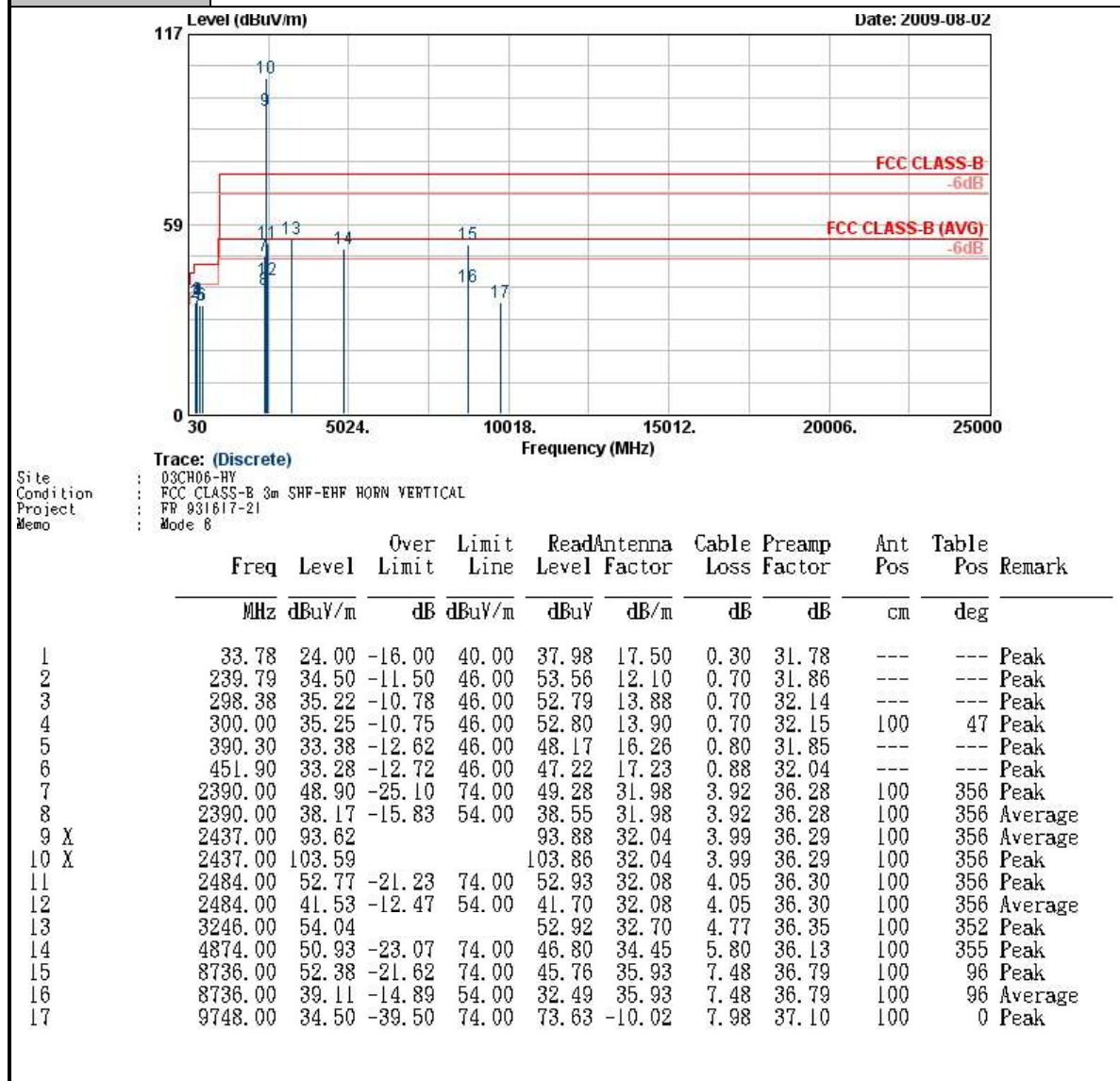
Trace: (Discrete)

: 03CH06-HV
: FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
: FR 931617-21
: Mode 8

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	99.93	29.38	-14.12	43.50	49.52	11.40	0.50	32.04	---	---	Peak
2	239.79	35.43	-10.57	46.00	54.49	12.10	0.70	31.86	---	---	Peak
3	299.73	35.53	-10.47	46.00	53.08	13.90	0.70	32.15	100	97	Peak
4	300.00	35.00	-11.00	46.00	52.55	13.90	0.70	32.15	---	---	Peak
5	386.80	33.47	-12.53	46.00	48.28	16.19	0.83	31.84	---	---	Peak
6	782.30	33.41	-12.59	46.00	43.72	20.63	1.20	32.14	---	---	Peak
7	2390.00	54.88	-19.12	74.00	55.26	31.98	3.92	36.28	100	12	Peak
8	2390.00	42.80	-11.20	54.00	43.18	31.98	3.92	36.28	100	12	Average
9 @	2437.00	96.86			97.12	32.04	3.99	36.29	100	12	Average
10 X	2437.00	106.53			106.79	32.04	3.99	36.29	100	12	Peak
11	2484.00	56.18	-17.82	74.00	56.34	32.08	4.05	36.30	100	12	Peak
12	2484.00	44.74	-9.26	54.00	44.91	32.08	4.05	36.30	100	12	Average
13	4874.00	51.13	-22.87	74.00	46.99	34.45	5.82	36.13	100	358	Peak
14	4874.00	40.05	-13.95	54.00	35.91	34.45	5.82	36.13	100	358	Average
15	8862.00	52.63	-21.37	74.00	45.77	36.05	7.65	36.84	100	247	Peak
16	8862.00	39.40	-14.60	54.00	32.54	36.05	7.65	36.84	100	247	Average

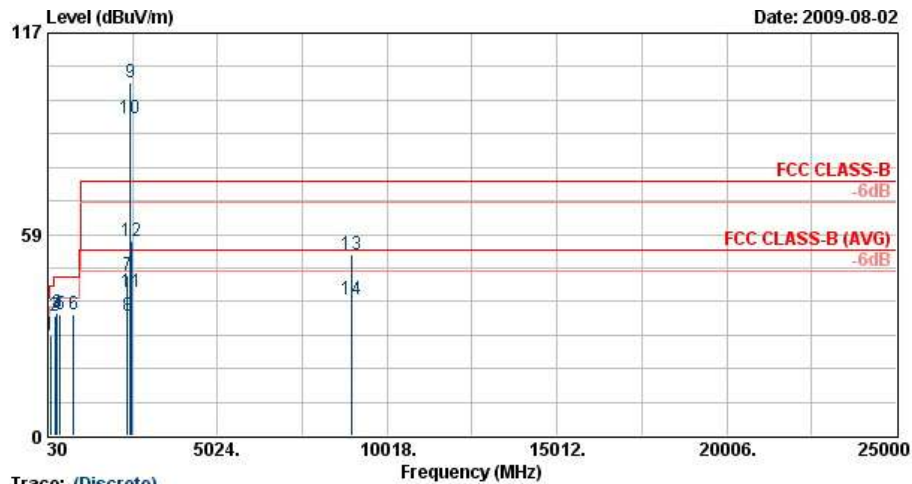


Test Mode :	Mode 8	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		





Test Mode :	Mode 9	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		

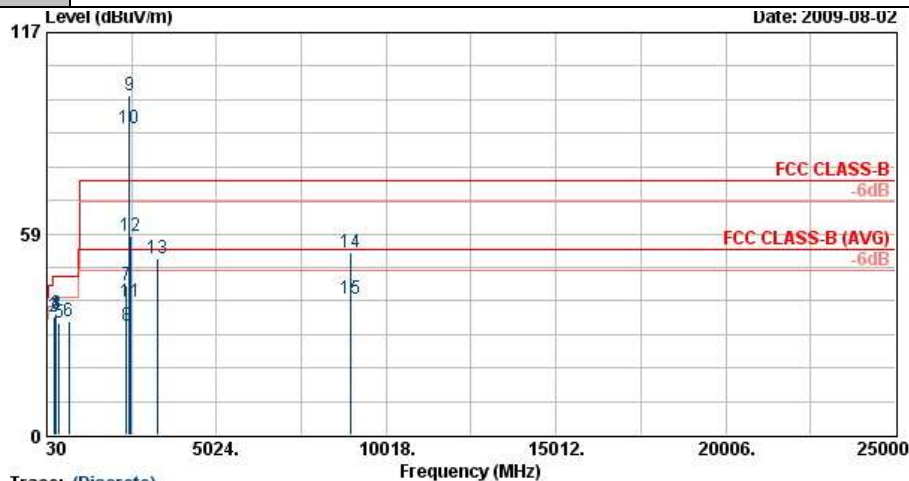


Site : 03CH06-HV
Condition : FCC CLASS-B 3m SHF-EHF HORN HORIZONTAL
Project : FR 931617-21
Memo : Mode 9

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	99.93	29.24	-14.26	43.50	49.38	11.40	0.50	32.04	---	Peak
2	239.79	34.92	-11.08	46.00	53.98	12.10	0.70	31.86	---	Peak
3	298.38	35.61	-10.39	46.00	53.17	13.88	0.70	32.14	100	Peak
4	300.00	35.16	-10.84	46.00	52.71	13.90	0.70	32.15	---	Peak
5	386.80	35.36	-10.64	46.00	50.18	16.19	0.83	31.84	---	Peak
6	782.30	35.03	-10.97	46.00	45.34	20.63	1.20	32.14	---	Peak
7	2382.00	46.38	-27.62	74.00	46.78	31.96	3.92	36.28	100	Peak
8	2382.00	34.58	-19.42	54.00	34.98	31.96	3.92	36.28	100	Average
9 X	2462.00	102.59			102.81	32.06	4.02	36.29	100	Peak
10 @	2462.00	92.10			92.31	32.06	4.02	36.29	100	Average
11	2483.50	41.71	-12.29	54.00	41.88	32.08	4.05	36.30	100	Average
12	2483.50	56.54	-17.46	74.00	56.71	32.08	4.05	36.30	100	Peak
13	8961.00	52.65	-21.35	74.00	45.61	36.15	7.77	36.88	100	Peak
14	8961.00	39.46	-14.54	54.00	32.42	36.15	7.77	36.88	100	Average



Test Mode :	Mode 9	Temperature :	26~27°C
Test Channel :	11	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		



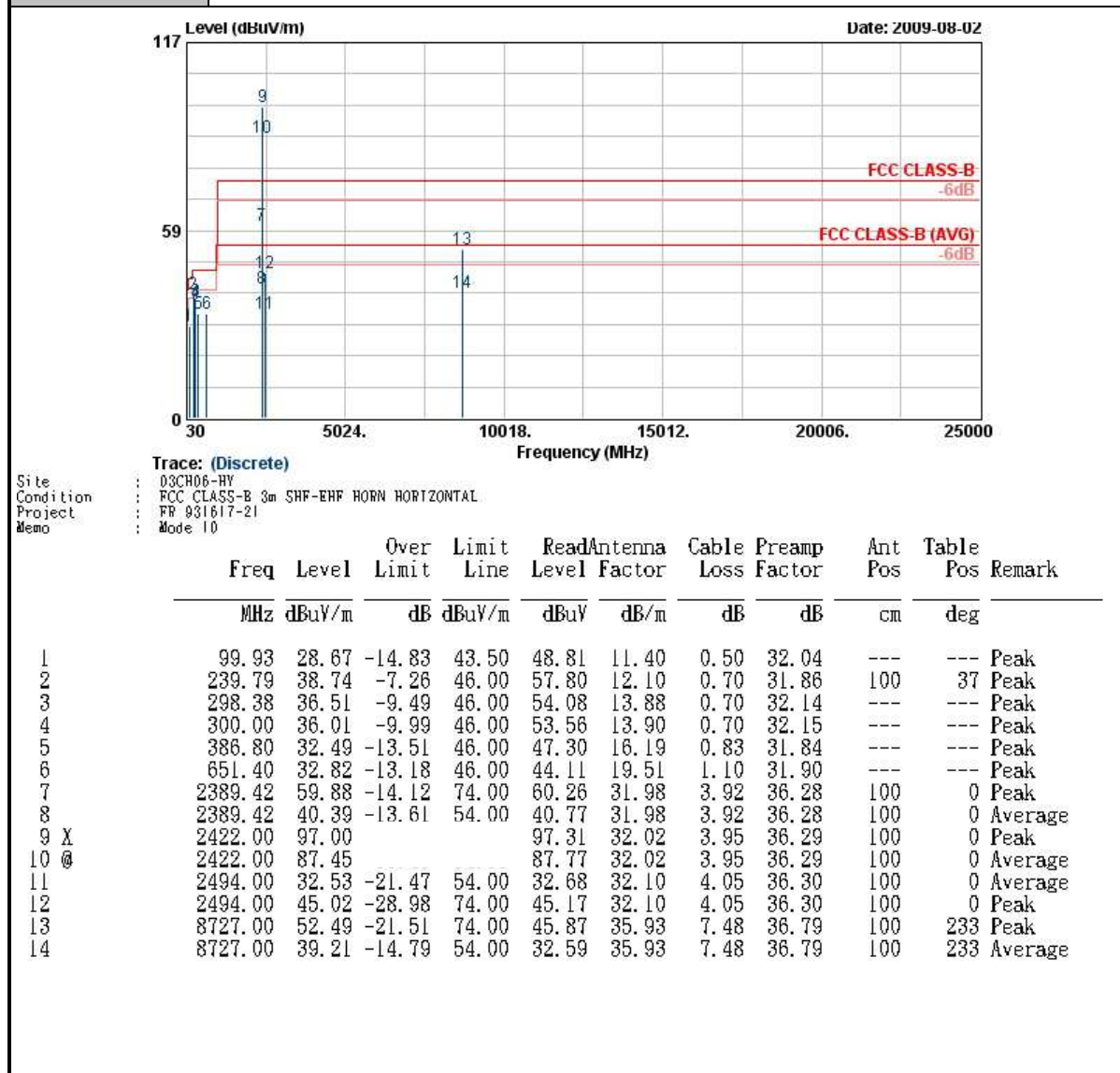
Trace: (Discrete)

Site : 03CH06-HV
 Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
 Project : FR 931617-21
 Memo : Mode 9

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.54	24.27	-15.73	40.00	36.29	19.30	0.30	31.61	---	---	Peak
2	239.79	34.30	-11.70	46.00	53.36	12.10	0.70	31.86	---	---	Peak
3	298.38	35.32	-10.68	46.00	52.88	13.88	0.70	32.14	100	176	Peak
4	300.00	35.04	-10.96	46.00	52.59	13.90	0.70	32.15	---	---	Peak
5	390.30	32.44	-13.56	46.00	47.23	16.26	0.80	31.85	---	---	Peak
6	689.90	32.94	-13.06	46.00	44.53	19.66	1.10	32.35	---	---	Peak
7	2372.00	43.52	-30.48	74.00	43.95	31.96	3.89	36.28	100	359	Peak
8	2372.00	31.68	-22.32	54.00	32.11	31.96	3.89	36.28	100	359	Average
9 X	2462.00	98.76			98.98	32.06	4.02	36.30	100	359	Peak
10 X	2462.00	89.07			89.28	32.06	4.02	36.29	100	359	Average
11	2484.42	38.75	-15.25	54.00	38.92	32.08	4.05	36.30	100	359	Average
12	2484.42	57.94	-16.06	74.00	58.11	32.08	4.05	36.30	100	359	Peak
13	3282.00	51.47			50.31	32.70	4.81	36.35	100	357	Peak
14	8976.00	52.90	-21.10	74.00	45.85	36.17	7.77	36.89	100	62	Peak
15	8976.00	39.64	-14.36	54.00	32.59	36.17	7.77	36.89	100	62	Average

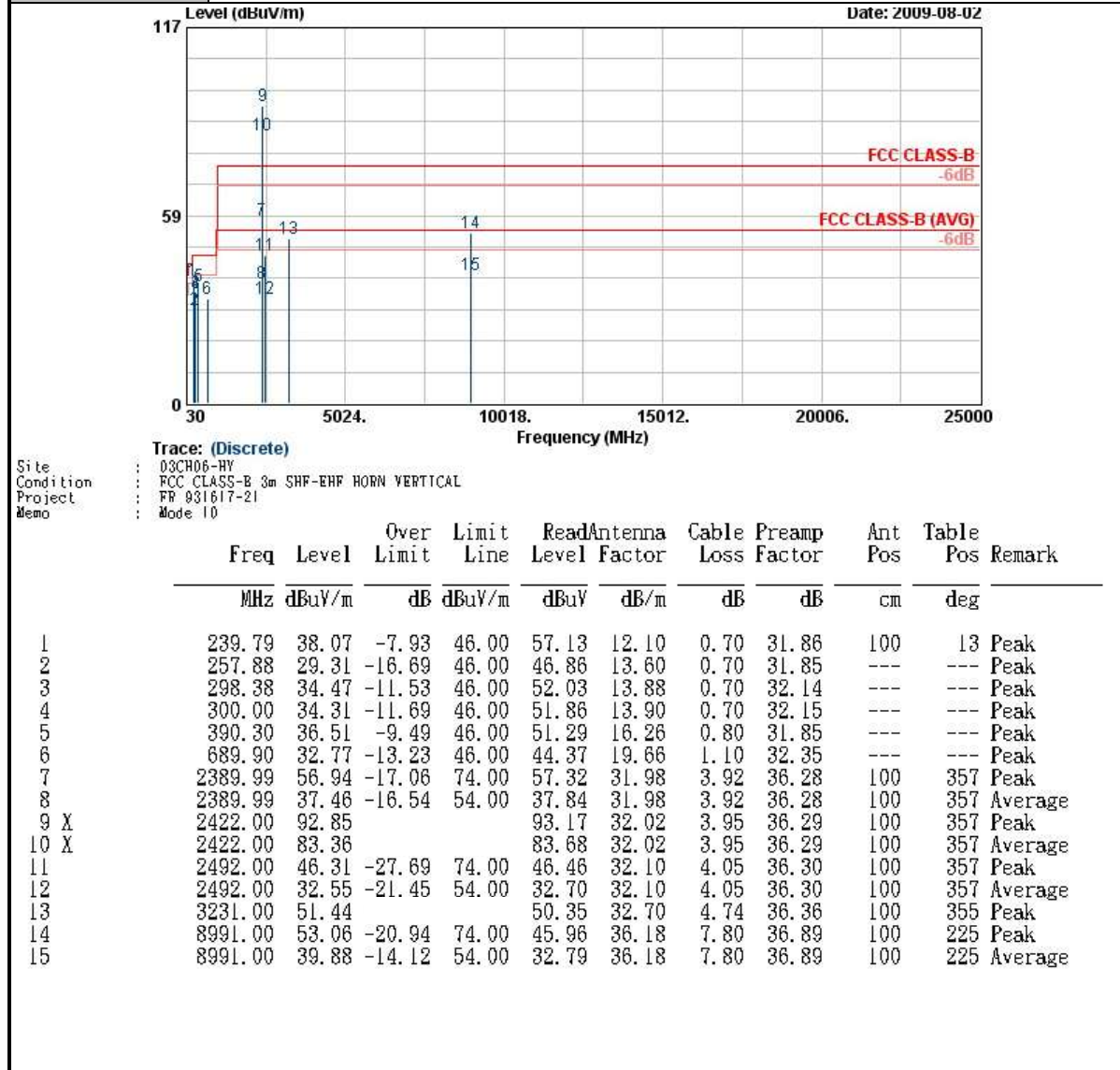


Test Mode :	Mode 10	Temperature :	26~27°C
Test Channel :	03	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



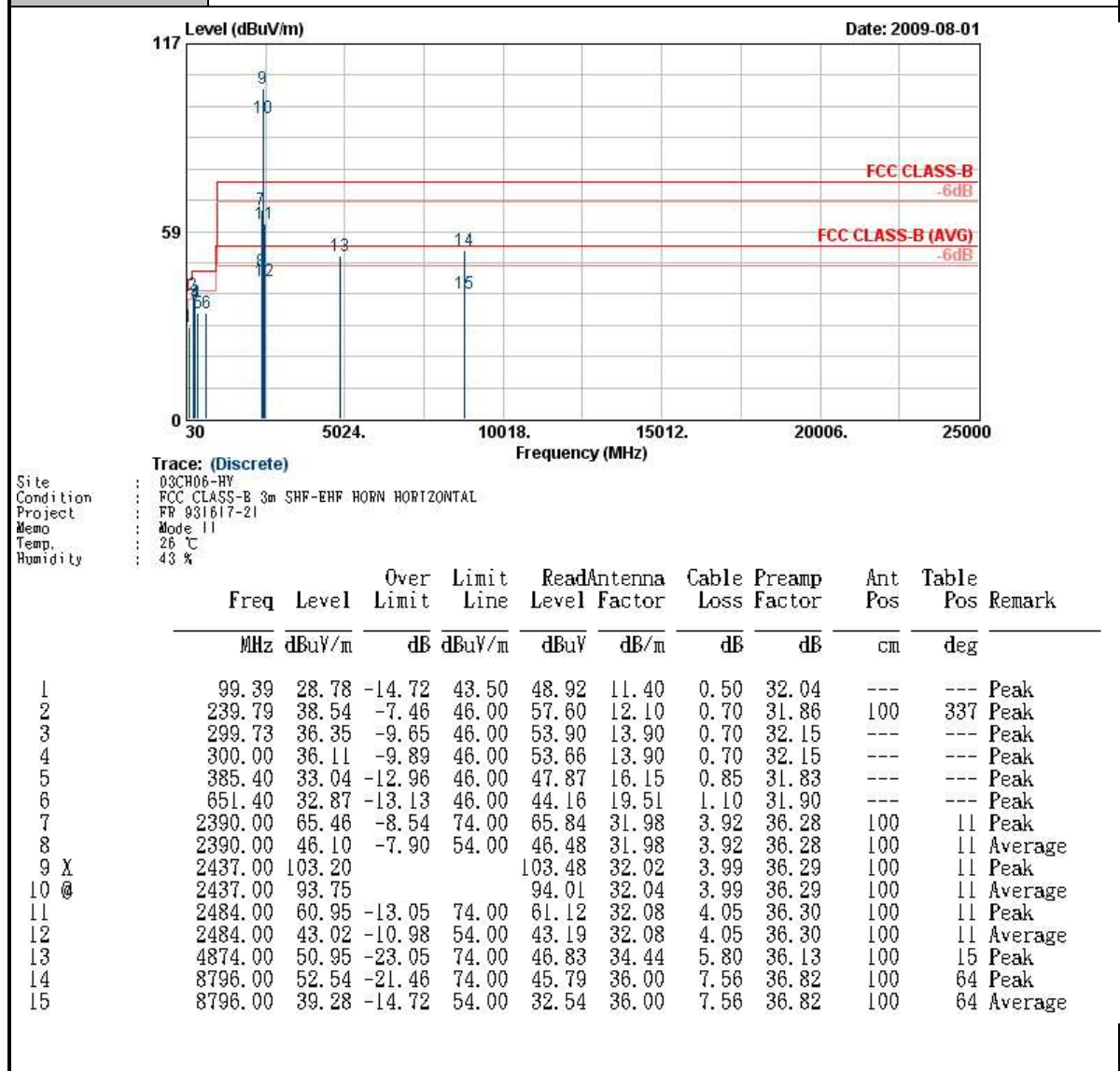


Test Mode :	Mode 10	Temperature :	26~27°C
Test Channel :	03	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		



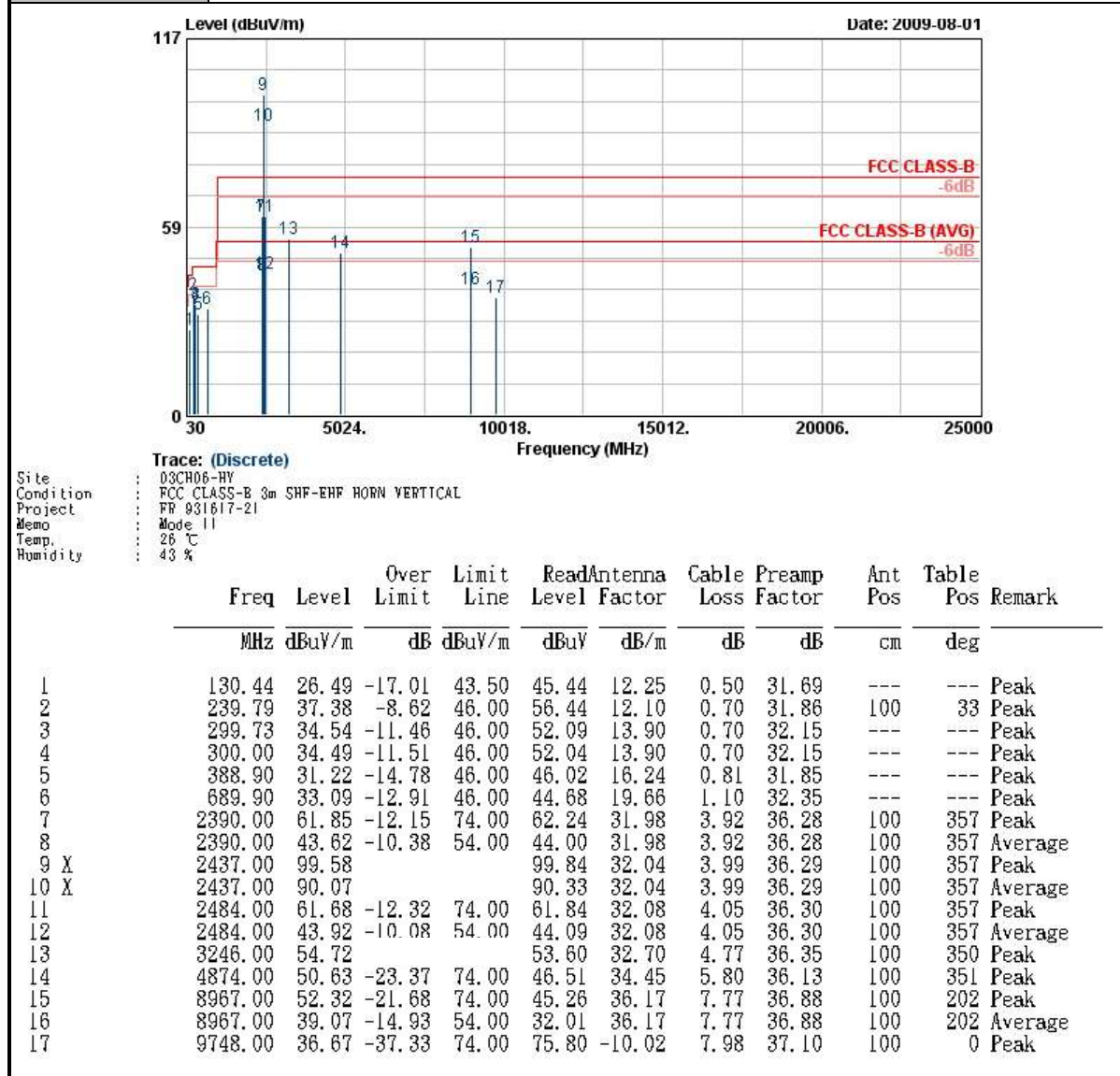


Test Mode :	Mode 11	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



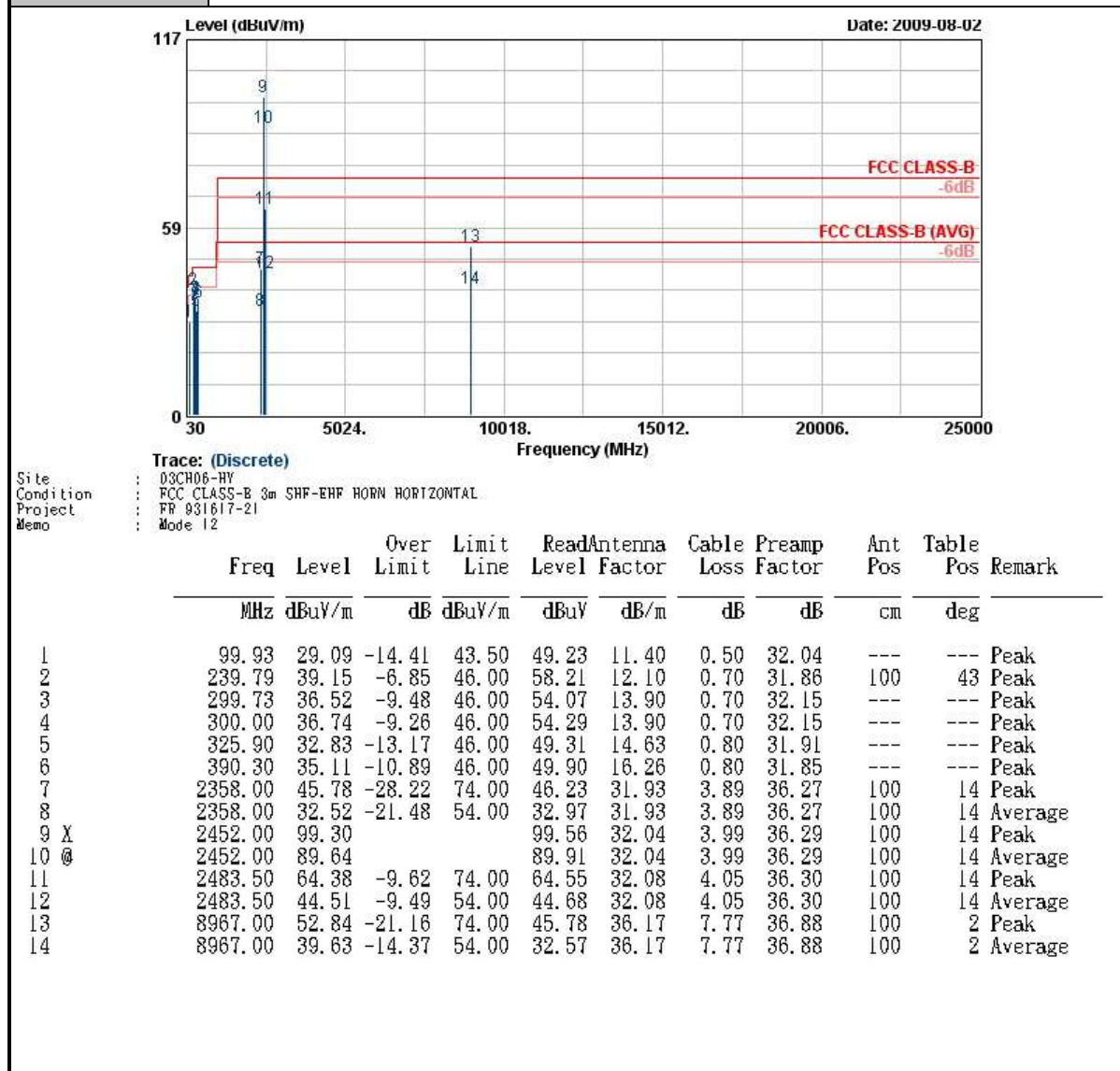


Test Mode :	Mode 11	Temperature :	26~27°C
Test Channel :	06	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	1. #9 and #10 are Fundamental Signals which can be ignored. 2. #13 signal is not in the restricted band.		



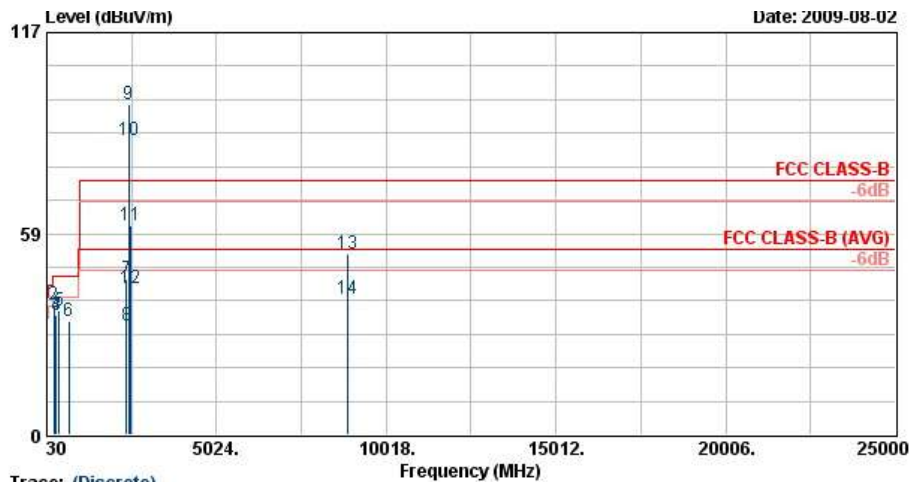


Test Mode :	Mode 12	Temperature :	26~27°C
Test Channel :	09	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Horizontal
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		





Test Mode :	Mode 12	Temperature :	26~27°C
Test Channel :	09	Relative Humidity :	43~44%
Test Engineer :	Elvis Chen	Polarization :	Vertical
Remark :	#9 and #10 are Fundamental Signals which can be ignored.		



Trace: (Discrete)
Site : 03CH06-HY
Condition : FCC CLASS-B 3m SHF-EHF HORN VERTICAL
Project : FR 931617-21
Memo : Mode 12

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.54	26.60	-13.40	40.00	38.61	19.30	0.30	31.61	---	---	Peak
2	239.79	37.88	-8.12	46.00	56.94	12.10	0.70	31.86	100	239	Peak
3	298.38	34.96	-11.04	46.00	52.52	13.88	0.70	32.14	---	---	Peak
4	300.00	34.83	-11.17	46.00	52.38	13.90	0.70	32.15	---	---	Peak
5	390.30	35.94	-10.06	46.00	50.73	16.26	0.80	31.85	---	---	Peak
6	689.90	33.07	-12.93	46.00	44.66	19.66	1.10	32.35	---	---	Peak
7	2382.00	45.13	-28.87	74.00	45.53	31.96	3.92	36.28	100	356	Peak
8	2382.00	31.57	-22.43	54.00	31.97	31.96	3.92	36.28	100	356	Average
9 X	2452.00	96.08			96.35	32.04	3.99	36.29	100	356	Peak
10 X	2452.00	85.82			86.09	32.04	3.99	36.29	100	356	Average
11	2483.50	60.90	-13.10	74.00	61.07	32.08	4.05	36.30	100	356	Peak
12	2483.50	42.58	-11.42	54.00	42.75	32.08	4.05	36.30	100	356	Average
13	8892.00	52.78	-21.22	74.00	45.86	36.08	7.68	36.85	100	33	Peak
14	8892.00	39.59	-14.41	54.00	32.67	36.08	7.68	36.85	100	33	Average



3.4 Antenna Requirements

3.4.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.4.2 Antenna Connected Construction

The antennas type used in this product is PIFA Antenna without any connector and it is considered to meet antenna requirement.

3.4.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMI Receiver	R&S	ESCS 30	100356	9kHz~2.75GHz	Aug. 01, 2008	Jul. 31, 2009	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9kHz~30MHz	Nov. 26, 2008	Nov. 25, 2009	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9kHz~30MHz	Nov. 26, 2008	Nov. 25, 2009	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9kHz~26.5GHz	Oct. 24, 2008	Oct. 23, 2009	Radiation (03CH06-HY)
Spectrum Analyzer	R&S	FSP40	100057	9kHz~40GHz	Oct. 16, 2008	Oct. 15, 2009	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz~1000MHz	Apr. 28, 2009	Apr. 27, 2010	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz~2GHz	Nov. 12, 2008	Nov. 11, 2009	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1G~18GHz	Aug. 18, 2008	Aug. 17, 2009	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AF-0801	95119	8G~18G	Oct. 28, 2008	Oct. 27, 2009	Radiation (03CH06-HY)
SHF-EHF Horn	SCHWARZBECK	BBHA 9170	BBHA9170251	15G~40GHz	Oct. 16, 2008	Oct. 15, 2009	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1G~26.5GHz	Nov. 11, 2008	Nov. 10, 2009	Radiation (03CH06-HY)
Pre Amplifier	Agilent	310N	186713	9kHz~1GHz	Apr. 20, 2009	Apr. 19, 2010	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	May 22, 2008	May 21, 2010	Radiation (03CH06-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.10	Normal(k=2)	0.05
Cable loss	0.10	Normal(k=2)	0.05
AMN insertion loss	2.50	Rectangular	0.63
Receiver Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch	+0.34/-0.35	U-shape	0.24
Combined standard uncertainty Uc(y)	1.13		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	2.26		

Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
Combined standard uncertainty Uc(y)	1.27		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	2.54		

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	±1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	±0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\log(1 - \Gamma_1 * \Gamma_2)$	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty Uc(y)	2.36				
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	4.72				

6 Certification of TAF Accreditation


財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate No. : L1190-090417

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	: ISO/IEC 17025:2005
Accreditation Number	: 1190
Originally Accredited	: December 15, 2003
Effective Period	: January 10, 2007 to January 09, 2010
Accredited Scope	: Testing Field, see described in the Appendix
Specific Accreditation Program	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities


Jay-San Chen
President, Taiwan Accreditation Foundation
Date : April 17, 2009

Pl, total 20 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix



Appendix A. Photographs of EUT

Please refer to Sporton report number EP931617-21 as below.