

FCC 47 CFR PART 15 SUBPART B

TEST REPORT

Test Report No.	: OT-227-RED-042
Reception No.	: 2207002112
Applicant	: O-JIN CORPORATION
Address	: 61-1, Seosomun-ro, Seodaemun-gu, Seoul, South Korea
Manufacturer	: BOHE Co., LTD
Address	: A-807, 14, Galmachi-ro 288beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Type of Equipment	: imation Portable HDD
Model Name	: IMEH100
Multiple Model Name	: IM4TEHC1H1AW, IM4TEHC1H1AB, IM2TEHC1H1AW, IM2TEHC1H1AB, IM1TEHC1H1AW, IM1TEHC1H1AB
FCC ID	: 2A3ZZ-IMEH100
Serial number	: N/A
Total page of Report	: 19 pages (including this page)
Date of Incoming	: April 21, 2022
Test Period	: May 4, 2022 ~ May 10, 2022
Date of Issuing	: July 11, 2022

SUMMARY

The equipment complies with the requirement of
ANSI C63.4: 2014 / FCC Part 15 Subpart B (CLASS B Digital devices &peripherals)
This test report contains only the results of a single test of the sample supplied for the examination.
It is not a general valid assessment of the features of the respective products of the mass-production.

오선택

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Revision History

Rev. No.	Issued Report No.	Issued Date	Revisions	Section Effected
0	OT-227-RED-042	July 11, 2022	Initial Release	All

* Please contact us (e-mail: info@onetech.co.kr) for verification of this test report.

1. APPLICANT AND MANUFACTURER INFORMATION

- .. Applicant O-JIN CORPORATION
- .. Address 61-1, Seosomun-ro, Seodaemun-gu, Seoul, South Korea
- .. Manufacturer BOHE Co., LTD
- .. Address A-807, 14, Galmachi-ro 288beon-gil, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
- .. Factory Dongguan Chenli Electronic Technology Co., Ltd.
- .. Address Room 902, 148 Hongye North Road, Tangxia Town, Dongguan City, Guangdong Province

EQUIPMENT CLASS	CLASS B Digital devices &peripherals
E.U.T. DESCRIPTION	Imation Portable HDD
MEASUREMENT PROCEDURES	ANSI C63.4: 2014
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT	
AUTHORIZATION REQUESTED	Certification
STANDARDS	FCC Part 15 (Class B)
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	None
FINAL TEST WAS CONDUCTED ON	10 m Semi anechoic chamber

ONETECH Corp. tested the above equipment in accordance with the requirements set forth in the above standard. The test results show that equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

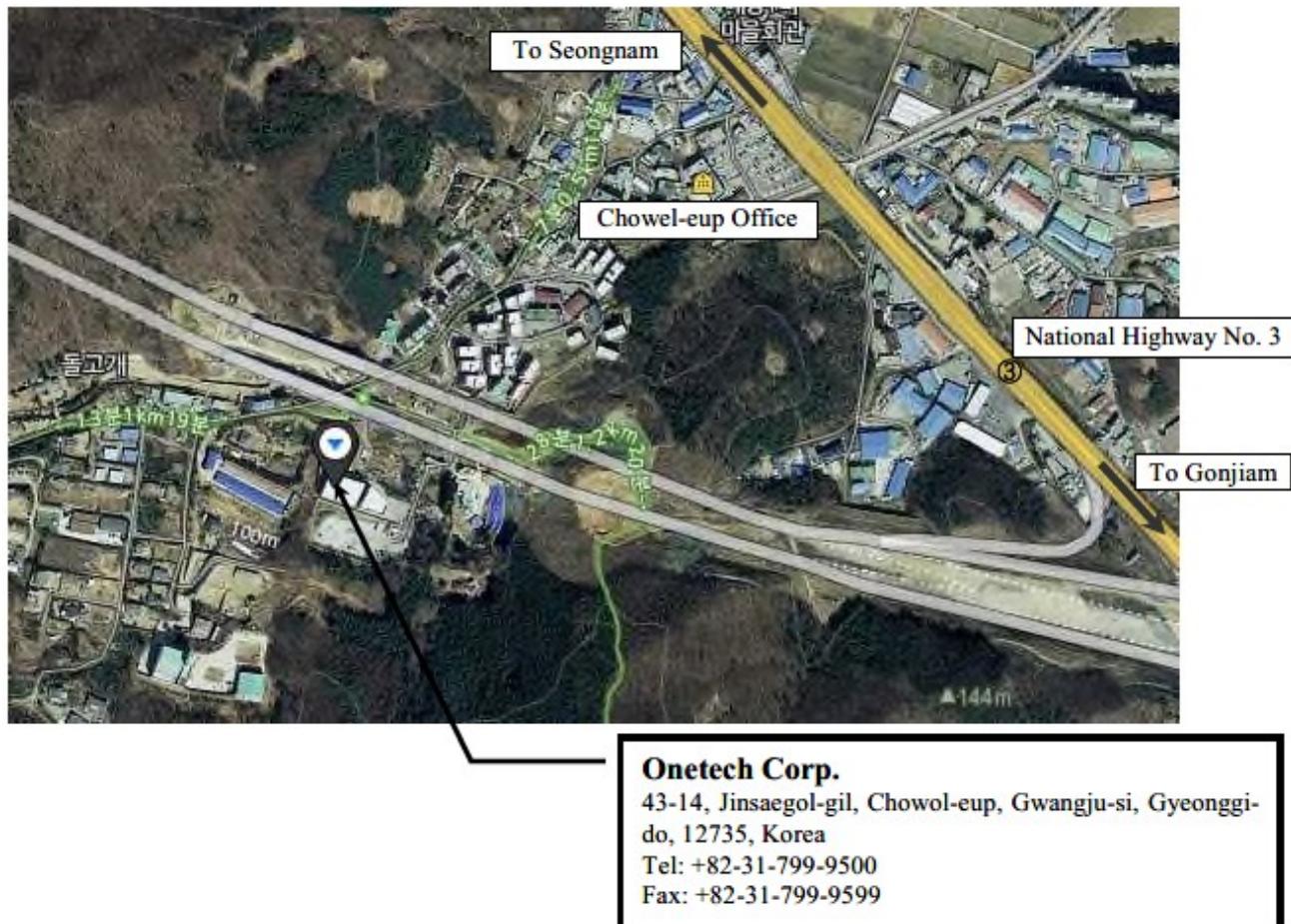
2 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025 by Radio Research Agency as accreditation body. The Onetech Corp. is accredited for measuring devices subject to Declaration of Conformity (DOC) under Parts 15 &18 as a Conformity Assessment Body (CAB) with designation number KR0013.

These measurement tests were conducted at Onetech Corp.

The 10 m semi anechoic chamber and conducted measurement facilities are located at

- 1) 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea
- 2) 12-5, Jinsaegol-gil 75 beon-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea



3. PRODUCT INFORMATION

3.1 Description of EUT

The O-JIN CORPORATION, Model IMEH100 (referred to as the EUT in this report) is a imation Portable HDD. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal & Plastic
LIAST OF EACH OSC. or CRY. RREQ.(FREQ. >= 1 MHz)	25 MHz
ELECTRICAL RATING	DC 5 V, 0.85 A
P.C. BOARD NAME	ASM225CM_HDD_BOARD
NUMBER OF PCB LAYERS	4 Layers
EXTERNAL CONNECTOR	USB Type C

3.2 Model Differences

- The following lists consist of the added model and their differences.

Model Name	Differences	Tested
IMEH100	Basic model (4TB)	O
IM4TEHC1H1AW	This model is identical to basic model except for the Bare HDD Capacitor & Color. (4TB, White Color)	X
IM4TEHC1H1AB	This model is identical to basic model except for the Bare HDD Capacitor & Color. (4TB, Black Color)	X
IM2TEHC1H1AW	This model is identical to basic model except for the Bare HDD Capacitor & Color. (2TB, White Color)	X
IM2TEHC1H1AB	This model is identical to basic model except for the Bare HDD Capacitor & Color. (2TB, Black Color)	X
IM1TEHC1H1AW	This model is identical to basic model except for the Bare HDD Capacitor & Color. (1TB, White Color)	X
IM1TEHC1H1AB	This model is identical to basic model except for the Bare HDD Capacitor & Color. (1TB, Black Color)	X

1. Applicant consigns only basic model to test, therefore this test report just guarantees the units which have been tested.
2. The Applicant/manufacturer is responsible for the compliance of all variants.

3.3 Support Equipment

The model numbers for all the equipments that were used in the tested system is:

Description	Model	Manufacturer	Connected to
imation Portable HDD (EUT)	IMEH100	BOHE Co., LTD	Notebook PC
Notebook PC	80XH	Lenovo	imation Portable HDD, ADAPTER
ADAPTER	PA-1450-55LR	LITE-ON TECHNOLOGY(CHANGZHOU)CO.,LTD.	Notebook PC

3.4 System Configuration

DEVICE TYPE	MODEL/PART NUMBER	MANUFACTURER
imation Portable HDD	IMEH100	BOHE Co., LTD

3.5 Cable Description for the EUT

Cable	Shielded	Ferrite Bead	Metal Shell	Length (m)	Connected to
imation Portable HDD_USB Type C	Y	N	N	0.45	Notebook PC
Notebook PC_DC IN	N	N	N	1.0	ADAPTER
Notebook PC_USB	Y	N	N	0.45	imation Portable HDD

3.6 Equipment Modifications

- None

4. TEST SUMMARY

4.1 Test standards and results

Test Items	Applied Standards	Results
Conducted Disturbance	ANSI C63.4: 2014	C
Radiated Disturbance	ANSI C63.4: 2014	C
C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable		

4.2 Test Condition

The test conditions of the noted test mode(s) in this test report are;

- EUT is connected to a notebook PC and tested by DATA Read&Write operation.
- Input power condition Adapter connected to the EUT during the measurements was AC 120 V, 60 Hz.

5. FINAL RESULT OF MEASUREMENT

Exploratory measurement was done in normal operation mode. And the final measurement was selected for the maximized emission level.

5.1 Conducted Disturbance

5.1.1 Operating environment

Ambient temperature : 23.1 °C

Relative humidity : 40.9 % R.H.

5.1.2 Test set-up

The EUT and other support equipment were placed on a non-conductive table, 0.8 m height above the reference ground plane. The power of EUT was fed through a 50 Ω/ 50 μH + 5 Ω LISN. The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

5.1.3 Measurement uncertainty

Conducted emission, quasi-peak detection	: 1.9 dB
Conducted emission, CISPR-average detection	: 1.9 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2. The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k = 2$.

5.1.4 Limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	CISPR 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

5.1.5 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.	Interval
■	ESCI	Rohde & Schwarz	Test Receiver	101420	March 8, 2022	1Y
■	LT32C/10	Afj Instruments	LISN	32032039322	March 21, 2022	1Y
□	3825/2	EMCO	LISN	9109-1867	March 8, 2022	1Y
■	11947A	Hewlett Packard	Transient Limiter	3107A02762	March 8, 2022	1Y

* S/W used in the test : Noise Terminal Voltage Measurement software / 2.00.0178

All test equipment used is calibrated on a regular basis.

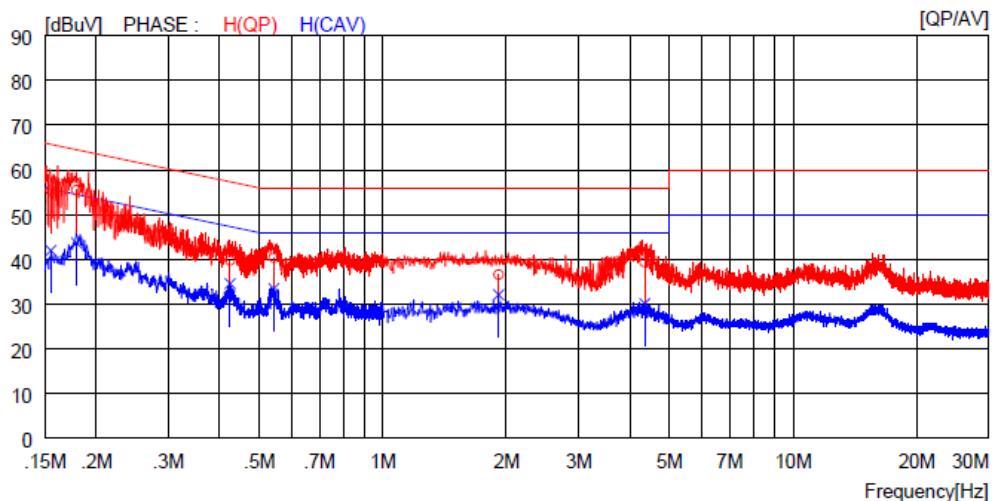
5.1.6 Test data

- .. Test Date : May 10, 2022
- .. Resolution bandwidth : 9 kHz
- .. Frequency range : 0.15 MHz ~ 30 MHz
- .. Test Result : PASS
- .. Remarks : Margin (dB) = Limit – Level (Result)
The Result level in below table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.



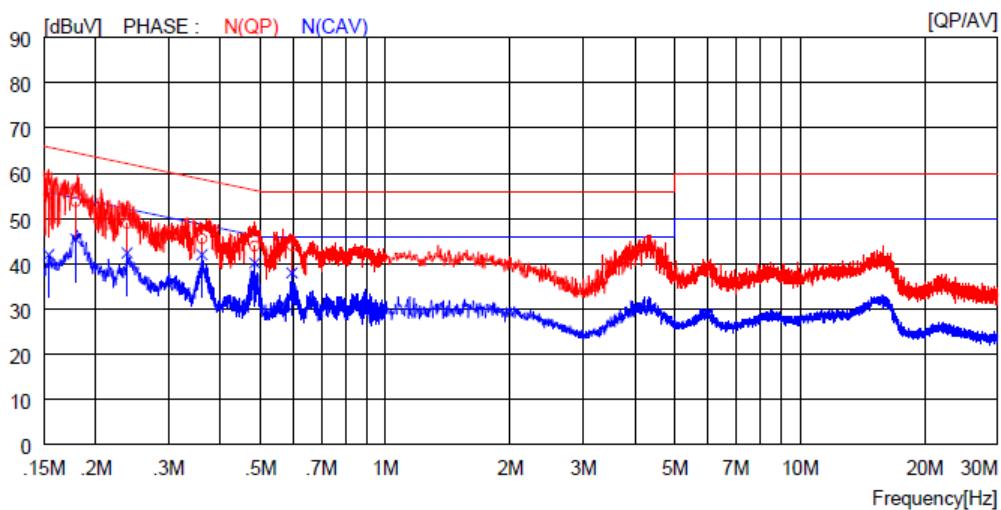
Tested by : Ban-Seok, Lee / Project Engineer

HOT LINE (0.15 MHz - 30 MHz)



NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15500	33.9	----	21.5	55.4	----	65.7	----	10.3	----	H (QP)
2	0.17900	34.0	----	21.5	55.5	----	64.5	----	9.0	----	H (QP)
3	0.42400	18.4	----	21.4	39.8	----	57.4	----	17.6	----	H (QP)
4	0.54200	19.0	----	21.4	40.4	----	56.0	----	15.6	----	H (QP)
5	1.91600	15.1	----	21.5	36.6	----	56.0	----	19.4	----	H (QP)
6	4.34800	17.9	----	21.5	39.4	----	56.0	----	16.6	----	H (QP)
7	0.15500	----	20.5	21.5	----	42.0	----	55.7	----	13.7	H (CAV)
8	0.17900	----	22.2	21.5	----	43.7	----	54.5	----	10.8	H (CAV)
9	0.42400	----	13.2	21.4	----	34.6	----	47.4	----	12.8	H (CAV)
10	0.54200	----	12.1	21.4	----	33.5	----	46.0	----	12.5	H (CAV)
11	1.91600	----	10.6	21.5	----	32.1	----	46.0	----	13.9	H (CAV)
12	4.34800	----	8.6	21.5	----	30.1	----	46.0	----	15.9	H (CAV)

NEUTRAL LINE (0.15 MHz - 30 MHz)



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15400	33.9	----	21.5	55.4	----	65.8	----	10.4	----	N (QP)
2	0.17900	32.2	----	21.5	53.7	----	64.5	----	10.8	----	N (QP)
3	0.23800	27.5	----	21.4	48.9	----	62.2	----	13.3	----	N (QP)
4	0.36100	24.1	----	21.4	45.5	----	58.7	----	13.2	----	N (QP)
5	0.48400	22.5	----	21.4	43.9	----	56.3	----	12.4	----	N (QP)
6	0.59500	22.6	----	21.4	44.0	----	56.0	----	12.0	----	N (QP)
7	0.15400	----	20.5	21.5	----	42.0	----	55.8	----	13.8	N (CAV)
8	0.17900	----	24.0	21.5	----	45.5	----	54.5	----	9.0	N (CAV)
9	0.23800	----	21.0	21.4	----	42.4	----	52.2	----	9.8	N (CAV)
10	0.36100	----	20.6	21.4	----	42.0	----	48.7	----	6.7	N (CAV)
11	0.48400	----	18.8	21.4	----	40.2	----	46.3	----	6.1	N (CAV)
12	0.59500	----	16.6	21.4	----	38.0	----	46.0	----	8.0	N (CAV)

5.2 Radiated Disturbance

5.2.1 Operating environment

Ambient temperature : 23.9 °C

Relative humidity : 48.7 % R.H.

5.2.2 Test set-up

The radiated emissions measurements were on the 10 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive table, 0.8 m height above the reference ground plane.

The frequency spectrum from 30 MHz to 40 000 MHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

5.2.3 Measurement uncertainty

Radiated emission electric field intensity, 30 MHz ~ 1 000 MHz	: ±4.5 dB
Radiated emission electric field intensity, 1 000 MHz ~ 40 000 MHz	: ±6.0 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2. The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k = 2$.

5.2.4 Limit

- FCC Part 15 Subpart B

Frequency of Emission (MHz)	Resolution bandwidth	Field strength @ 3 m (dB μ V/m)	
		Quasi-peak	
30 ~ 88		40.0	
88 ~ 216	120 kHz	43.5	
216 ~ 960		46.0	
Above 960		54.0	
>1 000	1 MHz	Peak Limit	CISPR Average Limit
		74.0	54.0

5.2.5 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.	Interval
■	ESW	Rohde & Schwarz	EMI Test Receiver	101851	March 8, 2022	1Y
□	3115	ETS-LINDGREN	Horn Antenna	34823	August 18, 2021	1Y
■	VULB9163	Schwarzbeck	TRILOG Brodband Antenna	9163-225	September 14, 2020	2Y
□	PAM-118A	Com-Power	Preamplifier	18040081	October 12, 2021	1Y
■	8447D	Hewlett Packard	Amplifier	2944A07777	March 8, 2022	1Y
■	CO3000	Innco Systems GmbH	Controller	N/A	N/A	N/A
■	DT5000	Innco Systems GmbH	Turn Table	N/A	N/A	N/A
■	MA4000-XPET	Innco Systems GmbH	Antenna Master	N/A	N/A	N/A
□	MA-4640-XPET	Innco Systems GmbH	Antenna Master	N/A	N/A	N/A

* S/W used in the test : Radiated Emission Measurement software / Version 2.00.0202

All test equipment used is calibrated on a regular basis.

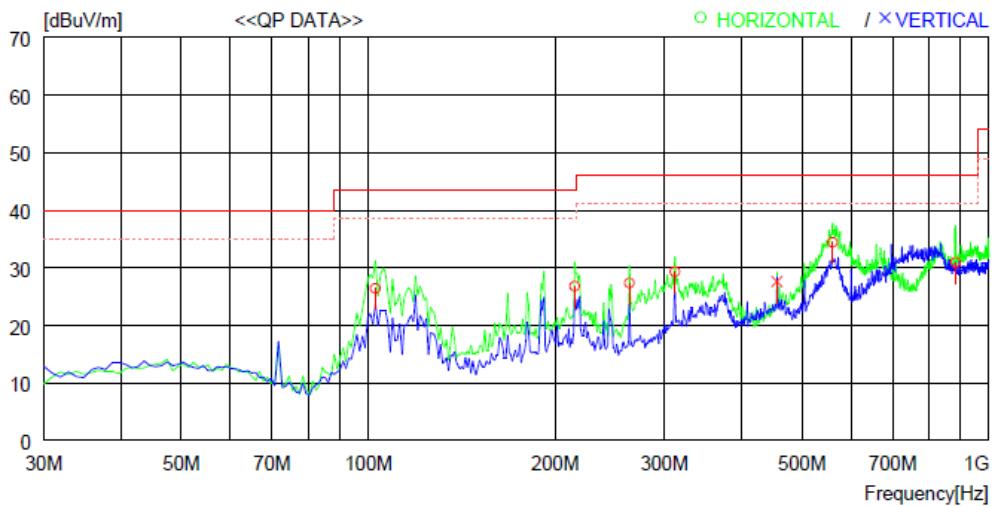
5.2.6 Test data

- .. Test Date : May 4, 2022
- .. Resolution bandwidth : 120 kHz (30 MHz - 1 000 MHz)
- .. Frequency range : 30 MHz ~ 1 000 MHz
- .. Measurement distance : 3 m
- .. Test Result : PASS
- .. Remarks : Margin (dB) = Limit – Result
Result = Reading value + Antenna Factor + Loss – Gain
Loss and Gain in below table means Cable Loss and Pre-amplifier gain.



Tested by : Ban-Seok, Lee / Project Engineer

Detector Mode (Quasi-Peak) (30 MHz - 1 GHz)



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE	
										[MHz]	[dBuV]
										[dB]	[dB]
----- Horizontal -----											
1	102.750	38.8	11.7	4.0	28.1	26.4	43.5	17.1	400	41	
2	215.270	37.6	11.3	5.6	27.7	26.8	43.5	16.7	200	133	
3	263.770	36.5	12.8	5.6	27.6	27.3	46.0	18.7	200	292	
4	312.270	37.2	13.6	6.1	27.6	29.3	46.0	16.7	200	292	
5	560.589	35.5	18.3	9.3	28.7	34.4	46.0	11.6	200	359	
6	884.559	25.0	21.9	11.9	27.9	30.9	46.0	15.1	200	359	
----- Vertical -----											
7	455.831	30.8	16.6	8.7	28.5	27.6	46.0	18.4	100	2	

6. SAMPLE CALCULATIONS

$$\text{dB}\mu\text{V} = 20 \text{ Log10} (\mu\text{V})$$

$$\text{Margin} = \text{Limit} - \text{Result}$$

- Example 1: 0.48400 MHz

Class B Limit = 46.3 dB μ V (CISPR-Average)

Reading = 18.8 dB μ V

Correction Factor = Cable Loss + Pulse Limiter
= 21.4 dB

Total = 40.2 dB μ V

Margin = 46.3 dB μ V – 40.2 dB μ V
= 6.1 dB

- Example 2: 560.589 MHz

Class B Limit = 46.0 dB μ V/m (Quasi-peak)

Reading = 35.5 dB μ V

Correction Factor = Antenna Factor (18.3 dB/m) + Cable Loss (9.3 dB) – Amp. Gain (28.7 dB)
= -1.1 dB

Total = 34.4 dB μ V/m

Margin = 46.0 dB μ V/m – 34.4 dB μ V/m
= 11.6 dB