



TEST REPORT

Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1010 FAX: 82-505-299-8311 www.kctl.co.kr		Report No.: KR23-SRF0179-B Page (1) of (15)	KCTL
1. Client ◦ Name : TAEHA MECHATRONICS Co., Ltd. ◦ Address : 421, Bakdal-ro, Manan-gu, Anyang-si, Gyeonggi-do, 13978, Republic of Korea ◦ Date of Receipt : 2023-04-27			
2. Use of Report : Certification			
3. Name of Product / Model : RMCU / RMCU-OG2			
4. Manufacturer / Country of Origin : TAEHA MECHATRONICS Co., Ltd. / Korea			
5. FCC ID : 2AP7F-RMCUOG2			
6. Date of Test : 2023-05-11 to 2023-05-23			
7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing (Address: 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)			
8. Test method used : FCC Part 25 Subpart C, 25.202			
9. Test Result : Refer to the test result in the test report			
Affirmation	Tested by Name : Euijung Kim (Signature)		Technical Manager Name : Heesu Ahn (Signature)
2023-06-09			
Eurofins KCTL Co.,Ltd.			
As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by Eurofins KCTL Co.,Ltd.			

REPORT REVISION HISTORY

Date	Revision	Page No
2023-06-01	Originally issued	-
2023-06-07	Update	4, 5
2023-06-09	Update	6

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Note. The report No. KR23-SRF0179-A is superseded by the report No. KR23-SRF0179-B.

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ Statement not required by the standard or client used for type testing

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1. General information

Client : TAEHA MECHATRONICS Co., Ltd.
 Address : 421, Bakdal-ro, Manan-gu, Anyang-si, Gyeonggi-do, 13978, Republic of Korea
 Manufacturer : TAEHA MECHATRONICS Co., Ltd.
 Address : 421, Bakdal-ro, Manan-gu, Anyang-si, Gyeonggi-do, 13978, Republic of Korea
 Laboratory : Eurofins KCTL Co.,Ltd.
 Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
 Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132
 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056
 CAB Identifier: KR0040
 ISED Number: 8035A
 KOLAS No.: KT231

2. Device information

Equipment under test : RMCU
 Model : RMCU-OG2
 Frequency range : 148.025 MHz ~ 150.025 MHz (Satellite)
 Modulation technique : SDPSK
 Number of channels : 800ch
 Power source : DC 24 V
 Antenna type : Shark antenna
 Antenna Gain : 2.7 dBi
 Software version : V 0.0.1.1
 Hardware version : REV.A.04.00
 Test device serial No. : N/A
 Operation temperature : -40 °C ~ 85 °C

2.1. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
-	-	-	-	-

2.2. Frequency/channel operations

This device contains the following capabilities:

Satellite

Ch.	Frequency (MHz)
10	148.023 75
...	...
400	148.998 75
...	...
810	150.023 75

Table 2.2.1. Satellite

2.3. Maximum output power

Test Channel	Frequency [MHz]	Peak power/4 kHz [dB m]	ANT. Gain [dB i]	Result e.i.r.p. [dB m]
10	148.023 75	37.84	2.70	40.54
400	148.998 75	38.34	2.70	41.04
810	150.023 75	37.76	2.70	40.46

Notes :

1. The measured Peak power used module data.
2. No maximum RF Peak power limit exists for this band (148 to 150.05 MHz) per Part 25.

3. Antenna requirement

Requirement of FCC part 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 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 provisions of this section.

-The transmitter has attached Shark antenna (external antenna).

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4. Summary of tests

FCC Part section(s)	Parameter	Test Condition	Test results
25.202(f)	Emission limits	R	Pass

Notes: (N/T: Not Tested, N/A: Not Applicable, R: Radiated, C: Conducted)

- For other test item, please refer to original test report.
- Report No. WLL REPORT# 13348-01 Rev 0 issued on April 15, 2014 by Washington Laboratories, Ltd.(FCC ID : XGS-ORBCOG2BAM1)
- All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- These tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
- The fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z It was determined that **X** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **X** orientation
- The test procedure(s) in this report were performed in accordance as following.
 - ANSI C63.10-2013
 - ANSI C63.26-2015
 - KDB 971168 D01 Power Meas License Digital Systems v03r01

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicated a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty ($\pm$)	
Radiated spurious emissions	9 kHz ~ 30 MHz	2.3 dB
	30 MHz ~ 1 000 MHz	2.5 dB
	1 000 MHz ~ 18 000 MHz	4.7 dB



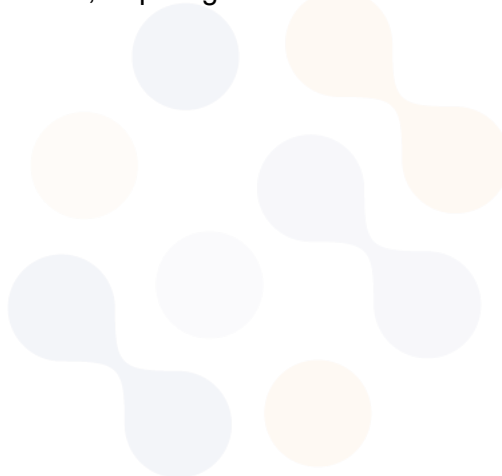
6. Test results

6.1. Field strength of spurious emissions

Limit

According to 25.202(f), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule

- (1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;
- (2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;
- (3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;
- (4) In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.

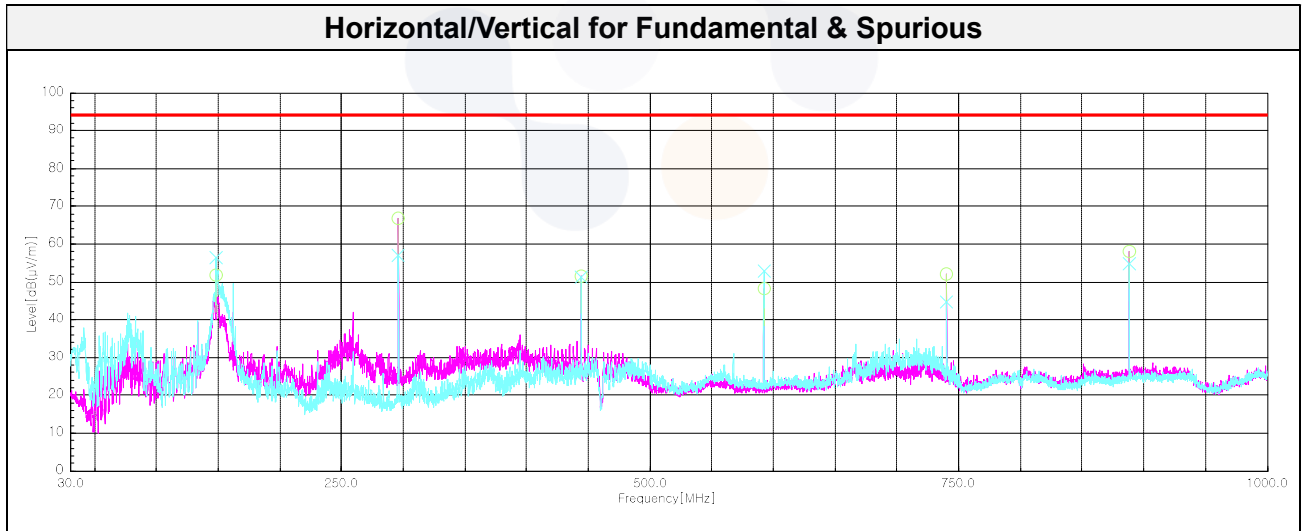


Test results (Below 1 000 MHz)

Channel 10_148.023 75 MHz

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data							
147.98*	H	65.60	16.60	-30.53	51.67	94.00	-
147.98*	V	70.30	16.60	-30.53	56.37	94.00	-
296.02	H	78.10	19.00	-30.16	66.94	94.00	27.06
296.02	V	68.20	19.00	-30.16	57.04	94.00	36.96
444.07	H	59.00	22.50	-29.97	51.53	94.00	42.47
444.07	V	58.80	22.50	-29.97	51.33	94.00	42.67
592.12	H	53.50	24.60	-29.90	48.20	94.00	45.80
592.12	V	58.20	24.60	-29.90	52.90	94.00	41.10
740.16	H	56.20	25.40	-29.50	52.10	94.00	41.90
740.16	V	48.80	25.40	-29.50	44.70	94.00	49.30
888.33	H	60.10	26.42	-28.51	58.01	94.00	35.99
888.33	V	56.80	26.42	-28.51	54.71	94.00	39.29

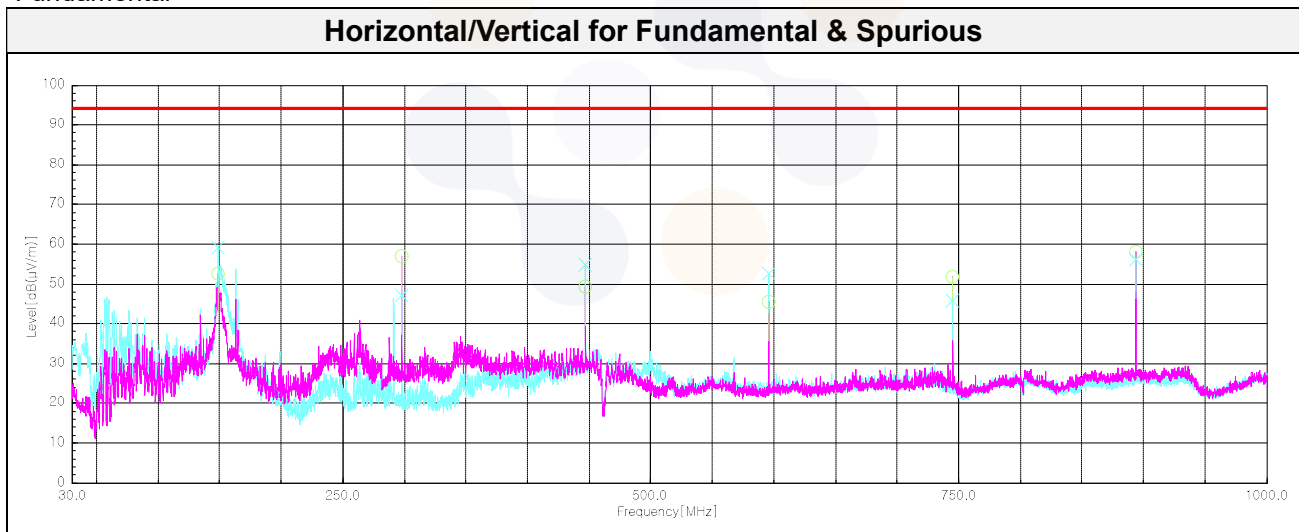
*Fundamental



Channel 400_148.998 75 MHz

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data							
148.95*	H	66.50	16.51	-30.52	52.49	94.00	-
148.95*	V	73.20	16.51	-30.52	59.19	94.00	-
297.96	H	68.10	19.10	-30.17	57.03	94.00	36.97
297.96	V	58.30	19.10	-30.17	47.23	94.00	46.77
447.10	H	56.70	22.50	-29.95	49.25	94.00	44.75
447.10	V	62.40	22.50	-29.95	54.95	94.00	39.05
596.00	H	50.70	24.60	-29.76	45.54	94.00	48.46
596.00	V	57.90	24.60	-29.76	52.74	94.00	41.26
745.13	H	55.60	25.50	-29.44	51.66	94.00	42.34
745.13	V	49.60	25.50	-29.44	45.66	94.00	48.34
894.03	H	60.00	26.50	-28.51	57.99	94.00	36.01
894.03	V	58.10	26.50	-28.51	56.09	94.00	37.91

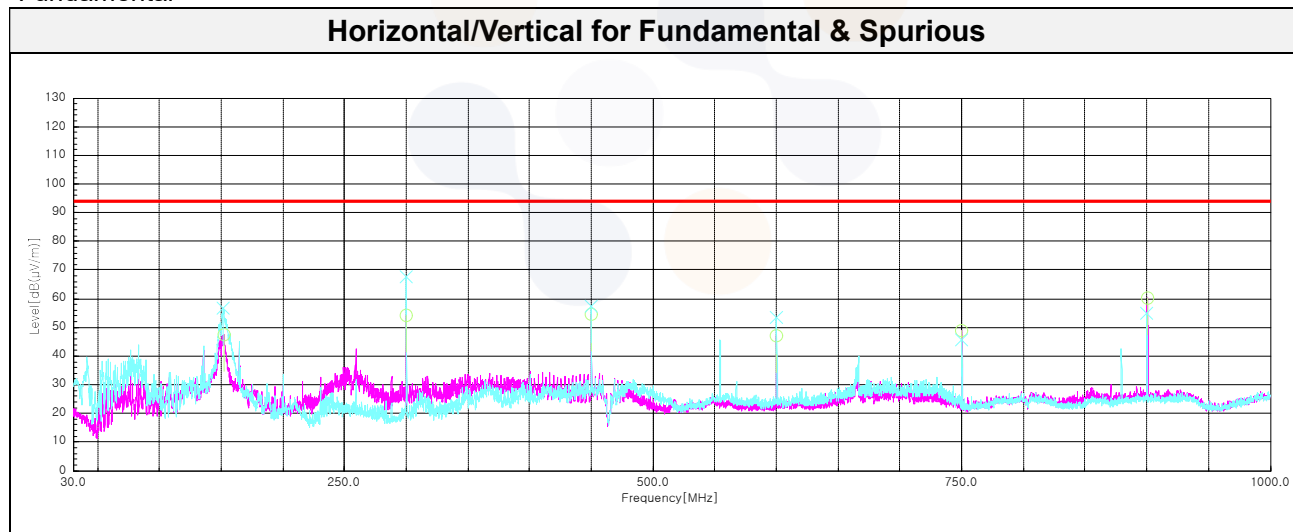
*Fundamental



Channel 810_150.023 75 MHz

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data							
152.46*	H	61.70	16.25	-30.50	47.45	94.00	-
151.74*	V	71.00	16.33	-30.50	56.83	94.00	-
300.02	H	65.40	19.10	-30.18	54.32	94.00	39.68
300.02	V	78.70	19.10	-30.18	67.62	94.00	26.38
450.13	H	61.90	22.60	-29.94	54.56	94.00	39.44
450.13	V	64.80	22.60	-29.94	57.46	94.00	36.54
600.12	H	52.00	24.60	-29.62	46.98	94.00	47.02
600.12	V	58.50	24.60	-29.62	53.48	94.00	40.52
750.23	H	52.90	25.50	-29.39	49.01	94.00	44.99
750.23	V	49.50	25.50	-29.39	45.61	94.00	48.39
900.82	H	62.20	26.50	-28.53	60.17	94.00	33.83
900.21	V	56.70	26.50	-28.55	54.65	94.00	39.35

*Fundamental

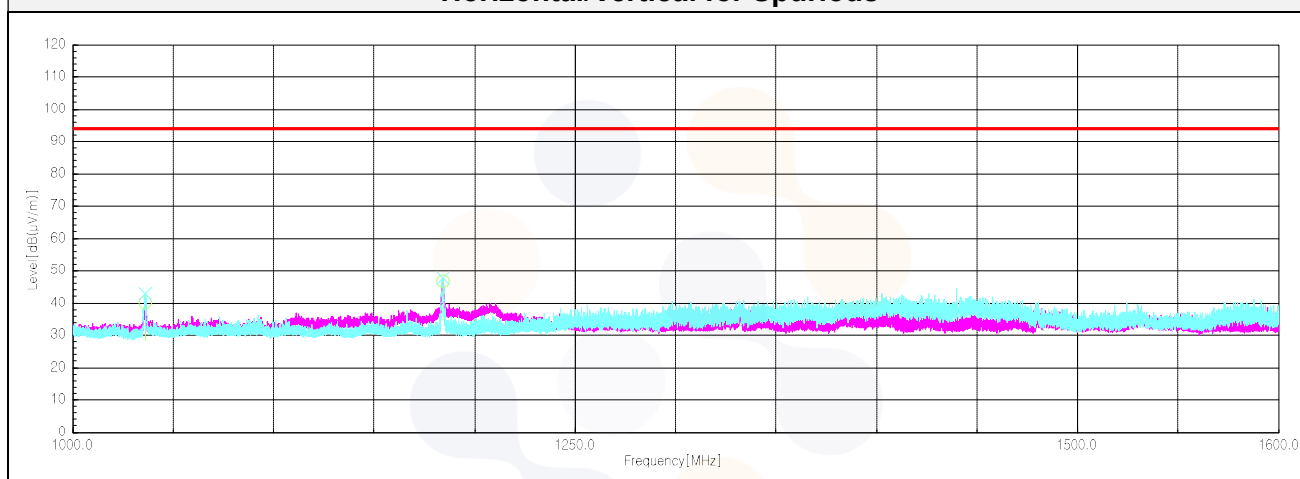


Test results (Above 1 000 MHz)

Channel 10_148.023 75 MHz

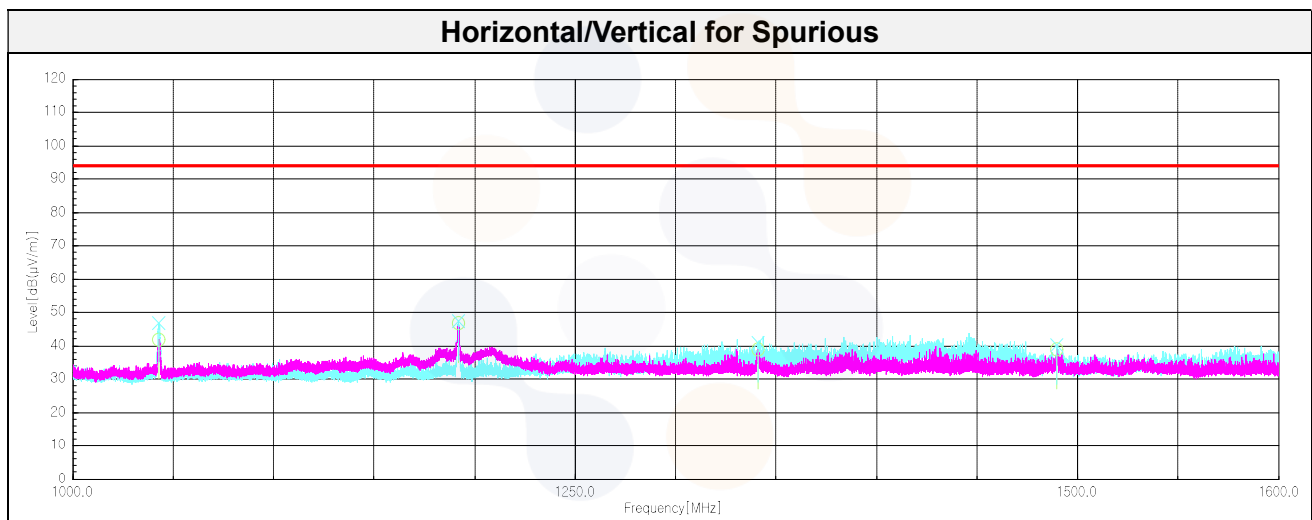
Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data							
1 036.18	H	62.80	25.00	-47.74	40.06	94.00	53.94
1 036.42	V	65.50	25.00	-47.73	42.77	94.00	51.23
1 184.22	H	69.00	25.40	-47.74	46.66	94.00	47.34
1 184.24	V	69.90	25.40	-47.74	47.56	94.00	46.44

Horizontal/Vertical for Spurious



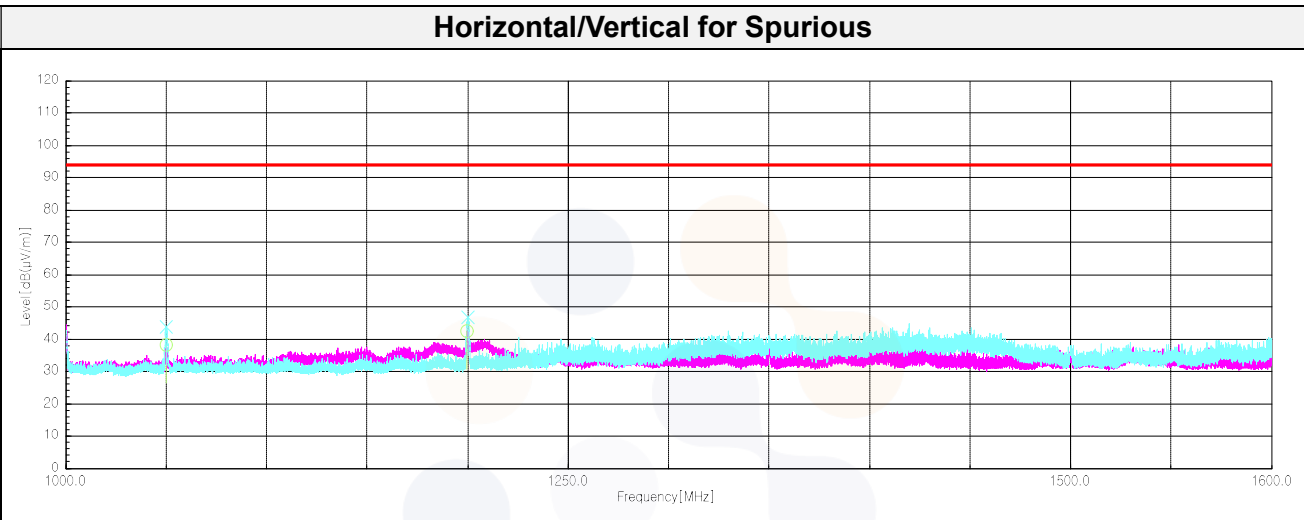
Channel 400_148.998 75 MHz

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data							
1 042.86	H	64.50	25.03	-47.72	41.81	94.00	52.19
1 043.00	V	69.30	25.03	-47.73	46.60	94.00	47.40
1 191.90	H	69.10	25.40	-47.70	46.80	94.00	47.20
1 191.90	V	69.60	25.40	-47.70	47.30	94.00	46.70
1 340.98	H	61.10	25.50	-47.72	38.88	94.00	55.12
1 341.00	V	62.90	25.50	-47.72	40.68	94.00	53.32
1 489.54	H	61.50	25.00	-47.58	38.92	94.00	55.08
1 489.82	V	62.80	25.00	-47.58	40.22	94.00	53.78



Channel 810_150.023 75 MHz

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB($\mu V/m$))	(dB($\mu V/m$))	(dB)
Peak data							
1 050.06	H	60.80	25.10	-47.86	38.04	94.00	55.96
1 050.04	V	66.50	25.10	-47.86	43.74	94.00	50.26
1 199.98	H	64.90	25.40	-47.66	42.64	94.00	51.36
1 200.30	V	68.90	25.40	-47.66	46.64	94.00	47.36



7. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Controller	INNCO SYSTEMS	CO3000	1441/54370322/P	-
Antenna Mast	INNCO SYSTEMS	MA4640-XP-ET	-	-
Turn Device	INNCO SYSTEMS	DS1200-S-1t	-	-
Network Analyzer	AGILENT	E5071B	MY42403524	24.02.09
Spectrum Analyzer	R&S	FSVA40	101575	23.07.22
Low Noise Amplifier	TESTEK	TK-PA18H	220124-L	23.12.02
Amplifier	SONOMA INSTRUMENT	310N	421821	23.12.14
Horn Antenna	SCHWARZBECK	BBHA9120D	2763	23.12.06
Bilog Antenna	Teseq GmbH	CBL 6112D	63756	24.11.17
Loop Antenna	R&S	HFH2-Z2	100355	24.08.10
DC Power Supply	(주)파워컴	DCP-50100A	20220610-02	24.02.02
High Pass Filter	Wainwright Instruments GmbH	WHKX10-900-1000-18000-40SS	SN49	23.12.14
Tunable Notch Filter	Wainwright Instruments GmbH	WTRCDB5-138-174-0.05-0.61-40SSK	1	24.01.20
Signal Generator	R&S	SMB100A	176206	24.01.19

End of test report