RADIO PERFORMANCE TEST REPORT

Test Report No. : **OT-229-RWD-011**

Reception No. : **2207002152**

Applicant : **SJI Co., Ltd.**

Address : **54-33, Dongtanhana 1-gil, Gyeonggi-do, Hwaseong-si, South Korea**

Manufacturer : **SJI Co., Ltd.**

Address : **54-33, Dongtanhana 1-gil, Gyeonggi-do, Hwaseong-si, South Korea**

Type of Equipment : **Asset Tracker**

Model Name : **IET10MO**

Multiple Model Name : **N/A**

Serial number : **N/A**

Total page of Report : **12 pages (including this page)**

Date of Incoming : **May 20, 2020**

Date of issue : **September 08, 2022**

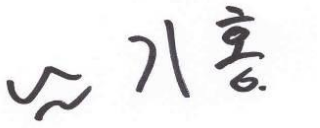
SUMMARY

The equipment complies with the standard; EN 303 413 V1.1.1

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.



Reviewed by
Tae-Ho, Kim / General Manager
ONETECH Corp.

Approved by
Ki-Hong, Nam / General Manager
ONETECH Corp.

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-205-RWD-061	May 29, 2020	Initial Release	All
1	OT-229-RWD-011	September 08, 2022	Changed company name.	All

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

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1. APPLICANT AND MANUFACTURER INFORMATION

-. Applicant : SJI Co., Ltd.

-. Address : 54-33, Dongtanhana 1-gil, Gyeonggi-do, Hwaseong-si, South Korea

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2. TEST SUMMARY

2.1 Test standards and results

CLAUSE	TEST ITEMS	RESULTS	REMARK
	EN 303 413 V1.1.1		
4.2.1	GUE adjacent frequency band selectivity performance	-	Note1
4.2.2	Spurious emissions	PASS	-

Note1 - The EUT have a RF Test already approved. (Model: SRM200A / Report Number: HCT-RO-2209-CE002)

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Purpose of the test

To determine whether the equipment under test fulfills the RF spectrum electro magnetic compatibility requirements of the standards stated in section 2.1.

2.4 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-20122/ C-14617/ G-10666/ T-11842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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3. EUT (Equipment Under Test)

3.1 Identification of EUT

-. Equipment : Asset Tracker

-. Model Name : IET10MO

-. Brand Name : N/A

-. Serial number : N/A

-. Manufacturer : SJI Co., Ltd.

3.2 Additional information about the EUT

The SJI Co., Ltd., Model IET10MO (referred to as the EUT in this report) is a Asset Tracker. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Asset Tracker	
Temperature Range	-30 °C ~ 60 °C	
OPERATING FREQUENCY	Sig Fox	868.034 MHz ~ 868.226 MHz (Tx) 869.429 MHz ~ 869.621 MHz (Rx)
	GPS	1 559 MHz ~ 1 610 MHz
	Bluetooth LE	2 402 MHz ~ 2 480 MHz
	WLAN 2.4 GHz	2 412 MHz ~ 2 472 MHz (802.11b/g/n(HT20))
MODULATION TYPE	Sig Fox	DBPSK
	Bluetooth LE	GFSK
	WLAN 2.4 GHz	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK) 802.11g/n(HT20): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)
ANTENNA TYPE		Sig Fox : Metal Antenna Bluetooth LE / WLAN 2.4 GHz : Chip Antenna GPS : Ceramic Patch Antenna
ANTENNA GAIN		Sig Fox: 2.50 dBi Bluetooth LE: 2.50 dBi WLAN 2.4 GHz: 2.50 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)		32.768 kHz, 26 MHz, 32 MHz

3.3 Peripheral equipment

-. None

3.4 Mode of operation during the test

-. The EUT was received signal form signal generator and then each modulation was configured for maximum signal gain and bandwidth. The EUT was operated in a manner representative of the typical usage of the equipment. During all testing, system components were manipulated within the confines of typical usage to maximize each emission. The applicant does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports on the EUT for radiated spurious emission testing.

For the above testing, following frequencies per channel were selected for each modulation.

3.5 Supported DNSS and frequency bands

GNSS	GNSS Signal designations	RNSS Frequency bands	Selection
BDS	B1	1 559 MHz ~ 1 610 MHz	☐
Galileo	E1	1 559 MHz ~ 1 610 MHz	☐
	E5a	1 164 MHz ~ 1 215 MHz	☐
	E5b	1 164 MHz ~ 1 215 MHz	☐
	E6	1 215 MHz ~ 1 300 MHz	☐
GLONASS	G1	1 559 MHz ~ 1 610 MHz	■
	G2	1 215 MHz ~ 1 300 MHz	☐
GPS	L1	1 559 MHz ~ 1 610 MHz	■
	L2	1 215 MHz ~ 1 300 MHz	☐
	L5	1 116 MHz ~ 1 215 MHz	☐
SBAS	L1	1 559 MHz ~ 1 610 MHz	☐
	L5	1 164 MHz ~ 1 215 MHz	☐

3.6 Alternative type(s)/model(s); also covered by this test report.

-. None

4. EUT MODIFICATIONS

-. None

5. Receiver spurious emissions test

5.1 Operating environment

Temperature : 24 °C

Relative humidity : 49 % R.H.

5.2 Definition

Receiver spurious emissions are emissions at any frequency when the GUE is in receive-only operating mode.

5.3 Test set-up and procedure

EN 303 413 V1.1.1 clause 5.5.2

5.4 Measurement uncertainty

Radiated emission electric field intensity, 30 MHz ~ 1000 MHz : 3.72 dB

Radiated emission electric field intensity, 1 GHz ~ 12.75 GHz : 3.86 dB

5.5 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Feb. 21, 2020 (1Y)
■ -	OSP120	Rohde & Schwarz	Open Switch and Control Unit	101364	N/A
■ -	OSP150	Rohde & Schwarz	Open Switch and Control Unit	100871	N/A
■ -	Controller CO 2000	Innco systems GmbH	Digital Controller	N/A	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	777	Apr. 08, 2020 (2Y)
☐ -	DT3000	Innco System	Turn Table	930611	N/A
■ -	BBHA 9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jul. 16, 2019 (1Y)
☐ -	BBHA 9170	Schwarzbeck	Horn Antenna	BBHA9170179	Jan. 07, 2020 (1Y)
☐ -	QMS-00208	Schwarzbeck	Horn Antenna	16111	Nov. 25, 2019 (1Y)
■ -	MA 2000	Innco systems GmbH	Antenna master	N/A	N/A
■ -	AS1700-EP	Innco systems GmbH	Antenna master	N/A	N/A
■ -	DS 1200 S	Innco systems GmbH	Turn table	N/A	N/A
☐ -	FPA3-0.8-6.0R/1329	Innco systems GmbH	Communication antenna	411068-0003	N/A
☐ -	FPA3-0.8-6.0R/1329	Innco systems GmbH	Communication antenna	411068-0001	N/A
■ -	DE3700-RH	Innco systems GmbH	Antenna master	N/A	N/A
☐ -	SFI101	Rohde & Schwarz	Wlan RSE Switchimg Aad Filter Unlt	N/A	N/A
■ -	SCU03	Rohde & Schwarz	Signal Conditioning unit	100333	Feb. 19, 2020 (1Y)
■ -	SCU18	Rohde & Schwarz	Signal Conditioning unit	102266	Jul. 24, 2019 (1Y)
☐ -	SCU40A	Rohde & Schwarz	Signal Conditioning unit	N/A	Feb. 20, 2020 (1Y)
☐ -	HPF 3GHz	Rohde & Schwarz	High Pass Filter	N/A	Feb. 19, 2020 (1Y)
☐ -	HPF 1.5GHz	Rohde & Schwarz	High Pass Filter	N/A	Feb. 19, 2020 (1Y)
☐-	HPF 3GHz	Rohde & Schwarz	High Pass Filter	N/A	Feb. 19, 2020 (1Y)
☐ -	F1 GSM 850	Rohde & Schwarz	Filter	N/A	Feb. 19, 2020 (1Y)
☐ -	F2 GSM 900	Rohde & Schwarz	Filter	N/A	Feb. 19, 2020 (1Y)
☐ -	F3 GSM 1800	Rohde & Schwarz	Filter	N/A	Feb. 19, 2020 (1Y)
☐ -	F4 GSM 1900	Rohde & Schwarz	Filter	N/A	Feb. 19, 2020 (1Y)
☐ -	F5 CDMA CELL	Rohde & Schwarz	Filter	N/A	Feb. 19, 2020 (1Y)
☐ -	F6 CDMA PCS	Rohde & Schwarz	Filter	N/A	Feb. 19, 2020 (1Y)

All test equipment used is calibrated on a regular basis.

5.6 Test data (Below 1 GHz)

-. Test Date : May 21, 2020 ~ May 25, 2020

-. Frequency range : 30 MHz ~ 1 GHz

-. GNSS Mode : GNSS Receiving Mode

Frequency (MHz)	Level (dBm)	Pol	Limit (dBm)	Margin (dB)
Measurements are 6 dB below these limits, the measurements are not reported.				

Remark: “H”: Horizontal, “V”: Vertical

5.7 Test data (Above 1 GHz)

-. Test Date : May 21, 2020 ~ May 25, 2020

-. Frequency range : 1 GHz ~ 8.3 GHz

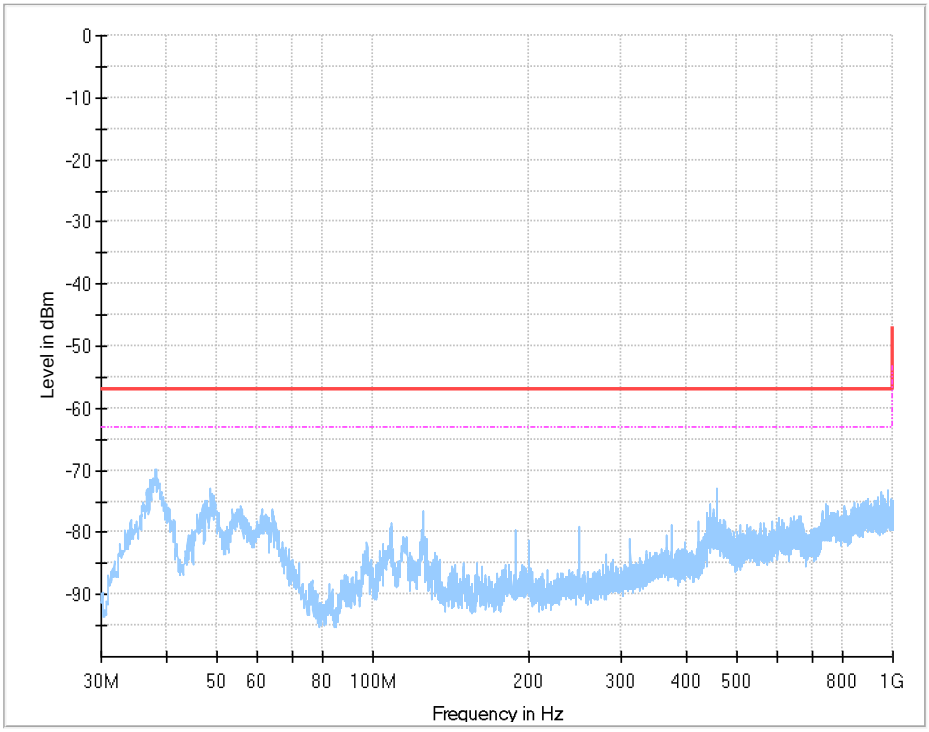
-. GNSS Mode : GNSS Receiving Mode

Frequency (MHz)	Level (dBm)	Pol	Limit (dBm)	Margin (dB)
Measurements are 6 dB below these limits, the measurements are not reported.				

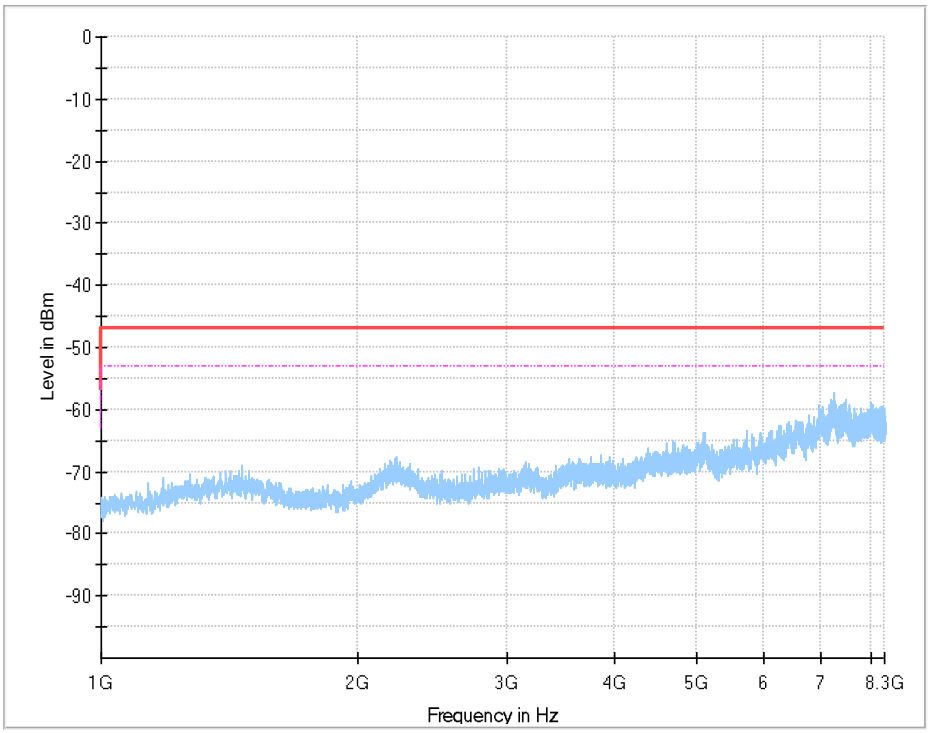
Remark: “H”: Horizontal, “V”: Vertical

Tested by: Hyung-Kwon, Oh / Assistant Manager

5.8 Plots of measurement data



Below 1 GHz



Above 1 GHz

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5.9 Limit

Subclause: 4.2.2.2

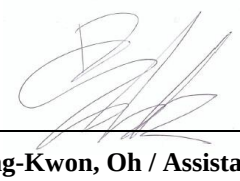
The spurious emissions of the GUE shall not exceed the values given in table 4-5.

In case of a GUE with an external antenna connector, these limits apply to emissions at the antenna port (conducted).

For emissions radiated by the cabinet or for emissions radiated by a GUE with an integral antenna (without an antenna connector), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Table 4-5: Spurious emission limits

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 8,3 GHz	-47 dBm	1 MHz



Tested by: Hyung-Kwon, Oh / Assistant Manager

APPENDIX I - TEST SET-UP PHOTO

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)