TEST REPORT

CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
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Report No.: CTK-2018-03252

1. Client

◦ Name : S-winnus Co., Ltd

◦ Address : NO. 701, 702, Centum Sky Biz A, 97, Centum jungang-ro, Haeundae-gu, Busan, Korea

◦ Date of Receipt : 2018-08-14

2. Manufacturer

◦ Name : S-winnus Co., Ltd

◦ Address : NO. 701, 702, Centum Sky Biz A, 97, Centum jungang-ro, Haeundae-gu, Busan, Korea

3. Use of Report : For FCC Certification

4. Test Sample / Model : iLock Plus / iLock-S200

5. Date of Test : 2018-08-23 to 2018-08-28

6. Test Standard(method) used : FCC 47 CFR PART 2, Subpart J
FCC 47 CFR PART 22, Subpart H
FCC 47 CFR PART 24, Subpart E

7. Testing Environment: Temp.: (23 ± 1) ℃, Humidity: (48 ± 5) % R.H.

8. Test Results : Compliance

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

Affirmation	Tested by Bong-seok Kim: (Signature)	Technical Manager Young-taek Lee: (Signature)

2018-10-17

Republic of KOREA **CTK Co., Ltd.**

REPORT REVISION HISTORY

Date	Revision	Page No
2018-10-17	Issued (CTK-2018-03252)	all

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1. General Information

1.1 Client Information

Company	S-winnus Co., Ltd
Contact Point	NO. 701, 702, Centum Sky Biz A, 97, Centum jungang-ro, Haeundae-gu, Busan, Korea
Contact Person	Name : Sunpyo Jeong E-mail : spjeong@swinnus.com Tel : +82-51-747-8933 Fax : +82-51-711-7433

1.2 Product Information

Product name		iLock Plus		
FCC ID		2AJOX-ILOCK-S200		
Model name		iLock-S200		
Serial number		Identical prototype		
EUT condition		Pre-production, not damaged		
GSM/WCDMA Module		Manufacturer : Telit Communications S.p.A.		
		FCC ID : RI7HE910		
Frequency range	**GSM**	Band	TX Frequency (MHz)	RX Frequency (MHz)
		850	824.2 - 848.8	869.2 - 893.8
		1900	1850.2 - 1909.8	1930.2 - 1989.8
	WCDMA	Band	TX Frequency (MHz)	RX Frequency (MHz)
		II	1852.4 - 1907.6	1932.4 - 1987.6
		V	826.4 - 846.6	871.4 - 891.6
Output power (Peak, conducted) (Module test report reference)	**GSM**	Band 850 : 1.995 W (33 dBm), Band 850(EGPRS) : 0.977 W (29.90 dBm) Band 1 900 : 0.977 W (29.90 dBm) Band 1 900(EGPRS) : 0.724 W (28.60 dBm)		
	WCDMA	Band II : 0.436 W (26.39 dBm) Band V : 0.460 W (26.63 dBm)		
Antenna Type		PIFA		
Antenna Gain		Band 850 MHz : -2.72 dBi Band 1 900 MHz : -4.07 dBi		
Output power(ERP, EIRP)	**GSM**	Band 850 : 0.650 W (28.13 dBm), Band 850(EGPRS) : 0.318 W (25.03 dBm) Band 1 900 : 0.383 W (25.83 dBm) Band 1 900(EGPRS) : 0.284 W (24.53 dBm)		
	WCDMA	Band II : 0.171 W (22.32 dBm) Band V : 0.150 W (21.76 dBm)		
Power Source		3.7 Vdc (Rechargeable Li-ion Battery)		

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Wideband Radio Communication Tester	R&S	CMW500	114635

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2. Facility and Accreditations

2.1 Test Facility

The measurement facility is located at (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yong-in-si, Gyeonggi-do, Korea.

2.2 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Registration Number	Logo
USA	**FCC**	FCC Part 15 & 18 EMI (Electromagnetic Interference / Emission)	805871	
CANADA	**ISED**	ISED EMI (3/10m test site)	8737A-2	
JAPAN	**VCCI**	VCCI V-3 EMI (Electromagnetic Interference / Emission)	C-986 T-1843 R-3627 G-387	
KOREA	**NRRA**	EMI (Electromagnetic Interference / Emission) EMS (Electromagnetic Susceptibility / Immunity)	KR0025	

2.3 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

3. Test Specifications

3.1 Standards

Section in FCC	Requirement(s)	Status (note1)	Test condition
2.1053, 22.917, 24.238	Field Strength of spurious radiation	C	Radiated
Other test requirements		NA(Note 3)	Conducted
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable			
Note 2: The data in this test report are traceable to the national or international standards.			
Note 3: The equipment contains an approved single module(FCC ID : RI7HE910). The test result is the same as the single module.			
Note 4: The tests were performed according to the method of measurements prescribed in KDB 971168 D01 v03.			

3.2 Mode of operation during the test

Test Mode
Mode 1 : GPRS 850 Link
Mode 2 : GPRS 1900 Link
Mode 3 : WCDMA Band II Link
Mode 4 : WCDMA Band V Link

* Note :
- Regards to the frequency band operation : The lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
- This device is equipped with an approved GSM/WCDMA module.
- This device cannot be used for voice-communication.

Test Channel and Frequency

Test Mode	Channel/Frequency	Low(L)	Middle(M)	High(H)
GSM 850	Channel	128	189	251
	Frequency [MHz]	824.2	836.4	848.8
GSM 1900	Channel	512	661	810
	Frequency [MHz]	1805.2	1880.0	1909.8
WCDMA Band II	Channel	9262	9400	9538
	Frequency [MHz]	1852.4	1880.0	1907.6
WCDMA Band V	Channel	4132	4182	4233
	Frequency [MHz]	826.4	836.4	846.6

3.3 Measurement Uncertainty

Compliance of the product is based on the measured value.
However, the measurement uncertainty is included for information purposes.
The measurement uncertainties given below are based on standard uncertainty multiplied by a coverage factor of k = 2, providing a level of confidence of approximately 95 %.

Measurement type	Uncertainty
Conducted emission of mains ports(150 kHz to 30 MHz)	2.62 dB (C.L.: Approx. 95 %, *K=2*)
Radiated emission(30 MHz to 1 GHz)	4.54 dB (C.L.: Approx. 95 %, *K=2*)
Radiated emission(Above 1GHz)	4.98 dB (C.L.: Approx. 95 %, *K=2*)

4. Test Requirements

4.1 Field Strength of Emissions

FCC 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

Test Location

☒ Testing was performed at a test distance of 3 meter SAC

Test measurement procedure:

Based on ANSI/TIA-603-D-2010

The EUT was placed on a turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

Limit

- FCC 22.917 Emission limitations for cellular equipment.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

- FCC 24.238 Emission limitations for Broadband PCS equipment.

The power of any emission shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log(P) dB.

Note :

ERP(or EIRP) = Reading + Space Loss
Space Loss = P_{SigGen} + G_T - ERP(or EIRP)
P_{SigGen} : power setting of the signal generator that produces the same received power reading as the DUT, in dBm
G_T : gain of the substitute antenna, in dBd (ERP) or dBi (EIRP);

The emission levels are not reported much lower than the applicable limits by over 20 dB and reported as "Not detected".

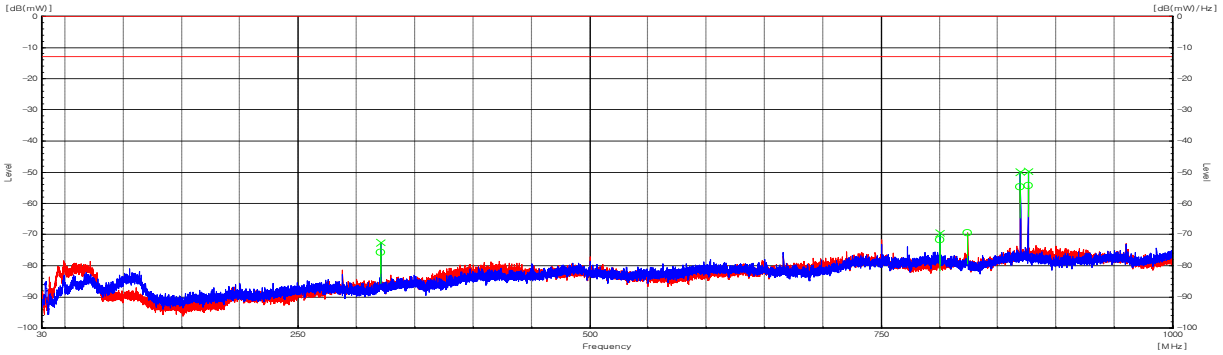
Test Results

The requirements are: ☒ Complies

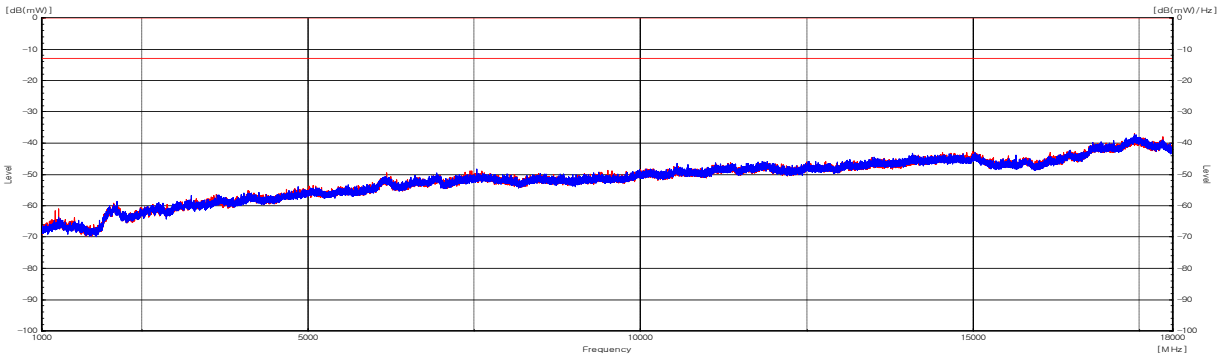
Test Data

[Mode 1 : GSM 850]

Channel : Low



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
320.67	H	-73.3	-2.4	-75.7	-13	62.7	
320.67	V	-69.5	-3.1	-72.6	-13	59.6	
799.99	V	-74.7	5.2	-69.5	-13	56.5	
799.99	H	-75.4	3.7	-71.7	-13	58.7	
824.19	H	-74.1	4.7	-69.4	-13	56.4	Carrier(TX)
869.14	V	-56.7	6.7	-50.0	-13	37.0	Carrier(RX)
869.24	H	-62.2	7.5	-54.7	-13	41.7	Carrier(RX)
875.94	V	-56.1	6.4	-49.7	-13	36.7	
875.94	H	-61.7	7.4	-54.3	-13	41.3	



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
Not detected							

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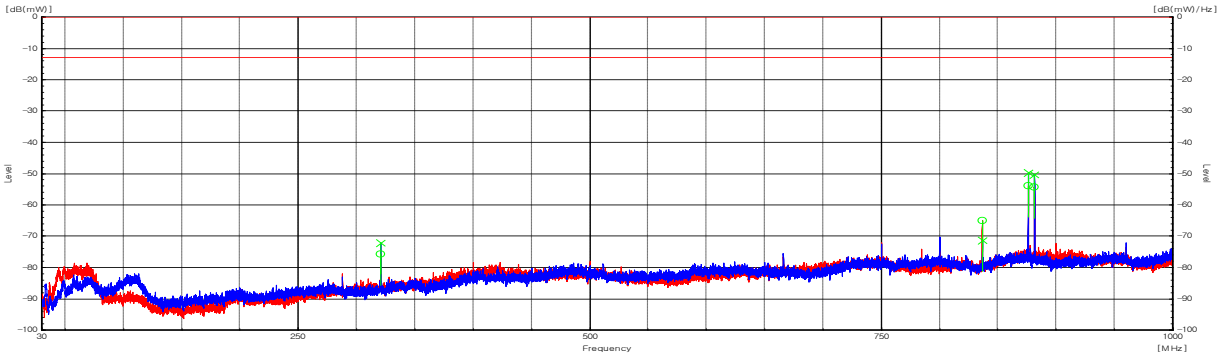
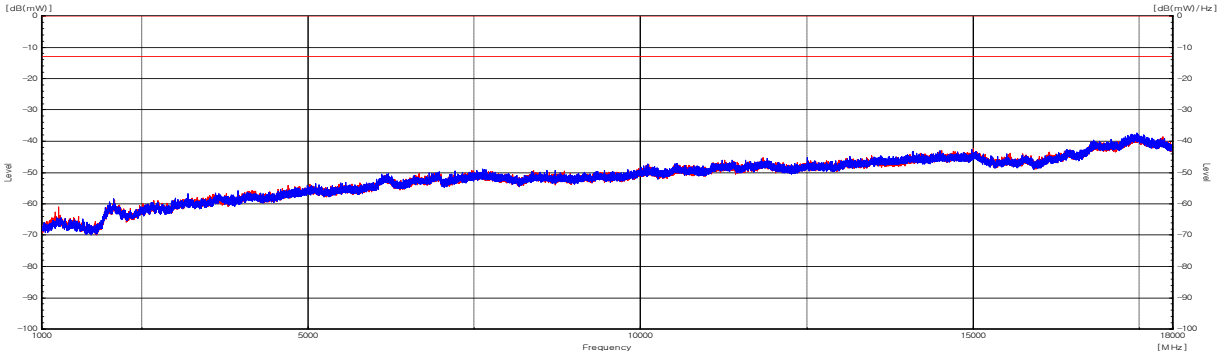
Channel : Middle

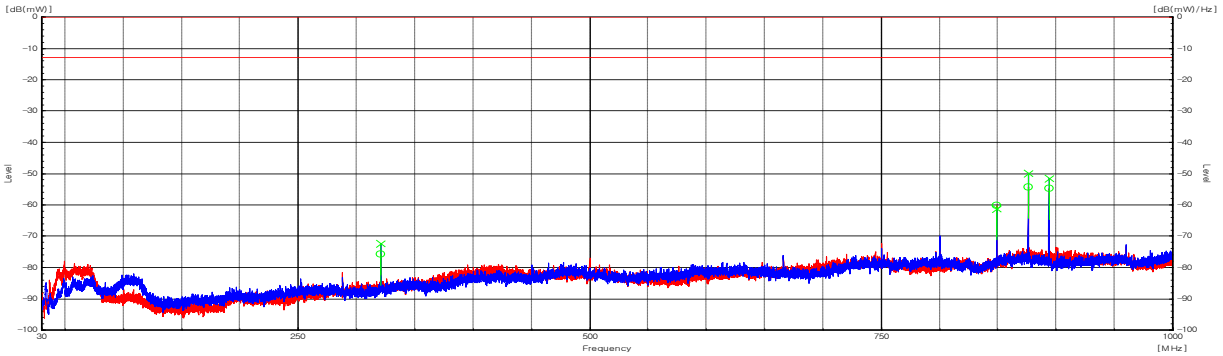


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
320.67	H	-73.4	-2.4	-75.8	-13	62.8	
320.67	V	-68.9	-3.1	-72.0	-13	59.0	
836.49	V	-75.5	4.3	-71.2	-13	58.2	Carrier(TX)
836.49	H	-69.5	4.4	-65.1	-13	52.1	Carrier(TX)
875.94	H	-61.4	7.4	-54.0	-13	41.0	
876.09	V	-56.2	6.4	-49.8	-13	36.8	
881.34	H	-61.8	7.4	-54.4	-13	41.4	Carrier(RX)
881.34	V	-56.3	6.0	-50.3	-13	37.3	Carrier(RX)

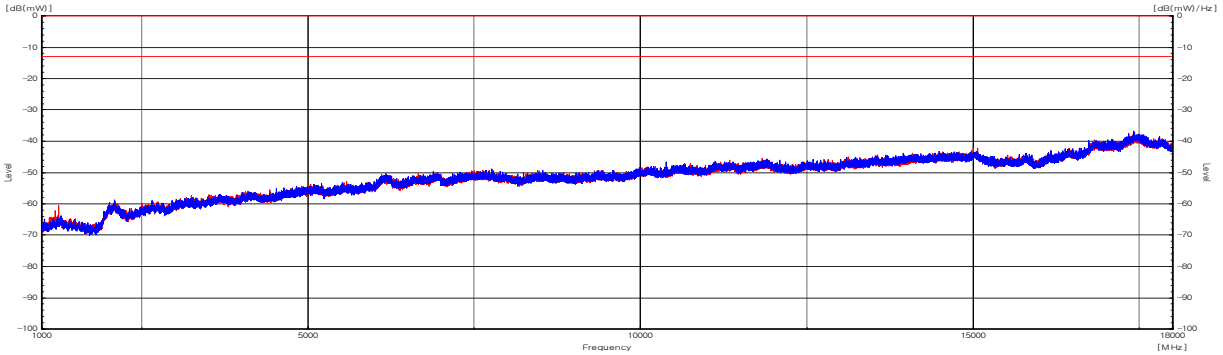


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
Not detected							

Channel : High



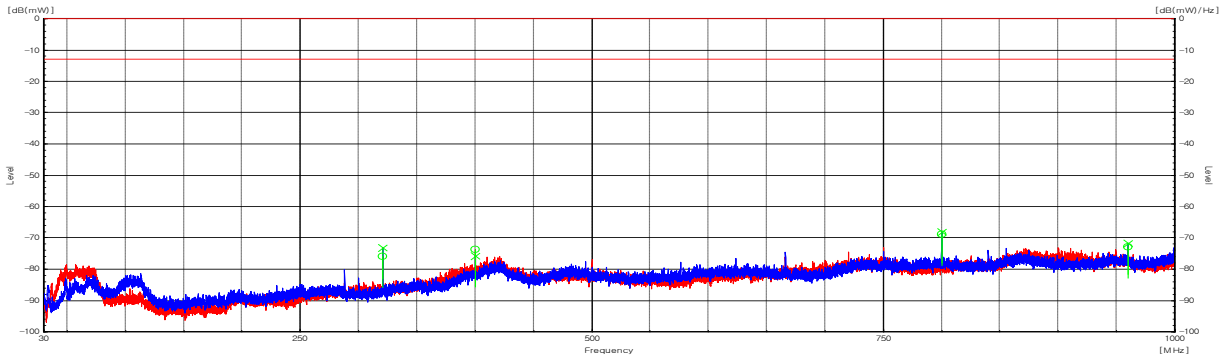
Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
320.67	H	-73.4	-2.4	-75.8	-13	62.8	
320.67	V	-69.2	-3.1	-72.3	-13	59.3	
848.79	H	-65.0	4.8	-60.2	-13	47.2	Carrier(TX)
848.84	V	-66.4	5.1	-61.3	-13	48.3	Carrier(TX)
875.94	H	-61.6	7.4	-54.2	-13	41.2	
875.94	V	-56.2	6.4	-49.8	-13	36.8	
893.75	V	-56.9	5.5	-51.4	-13	38.4	Carrier(RX)
893.90	H	-62.0	7.2	-54.8	-13	41.8	Carrier(RX)



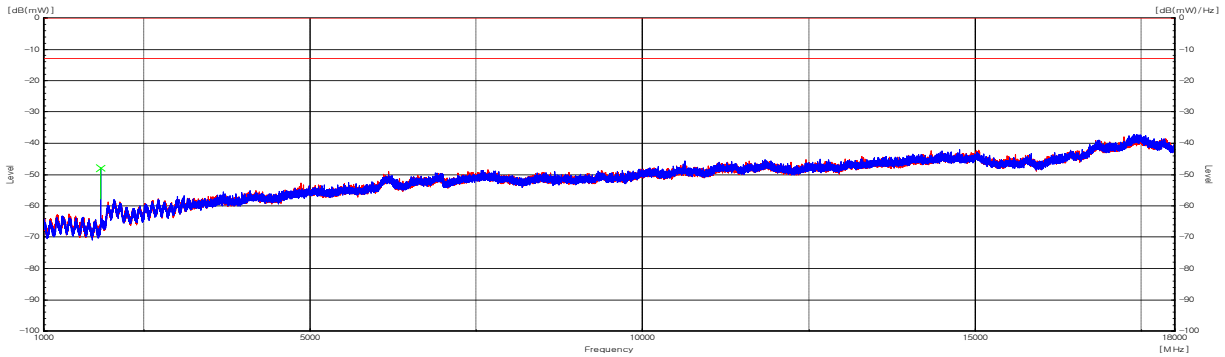
Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
Not detected							

[Mode 2 : GSM 1900]

Channel : Low



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
320.67	H	-73.7	-2.4	-76.1	-13	63.1	
320.67	V	-70.0	-3.1	-73.1	-13	60.1	
400.02	V	-75.5	-0.2	-75.7	-13	62.7	
400.02	H	-75.3	1.5	-73.8	-13	60.8	
799.99	H	-72.6	3.7	-68.9	-13	55.9	
799.99	V	-73.4	5.2	-68.2	-13	55.2	
960.05	V	-78.0	6.4	-71.6	-13	58.6	
960.10	H	-79.4	6.4	-73.0	-13	60.0	



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
1850.04	V	-51.1	3.2	-47.9	-13	34.9	carrier

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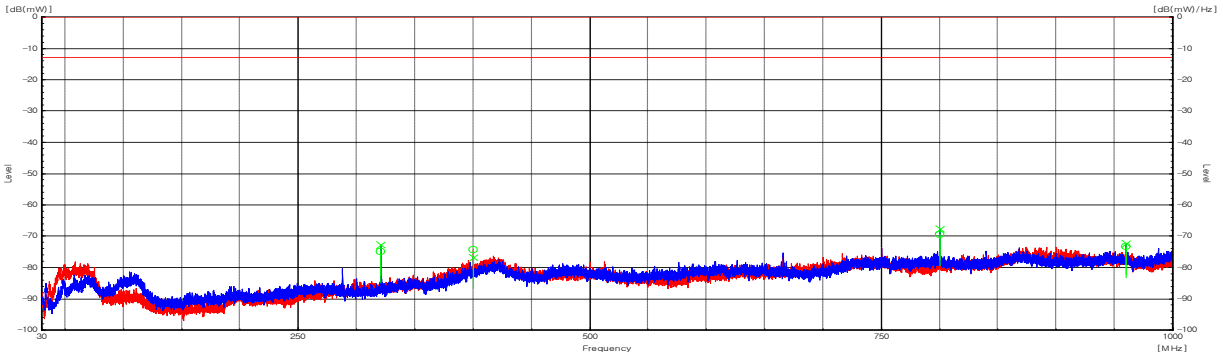
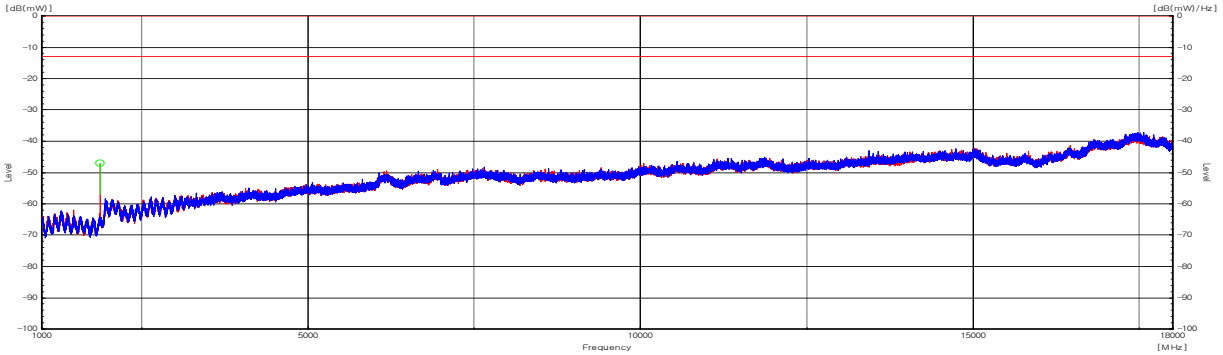
Channel : Middle

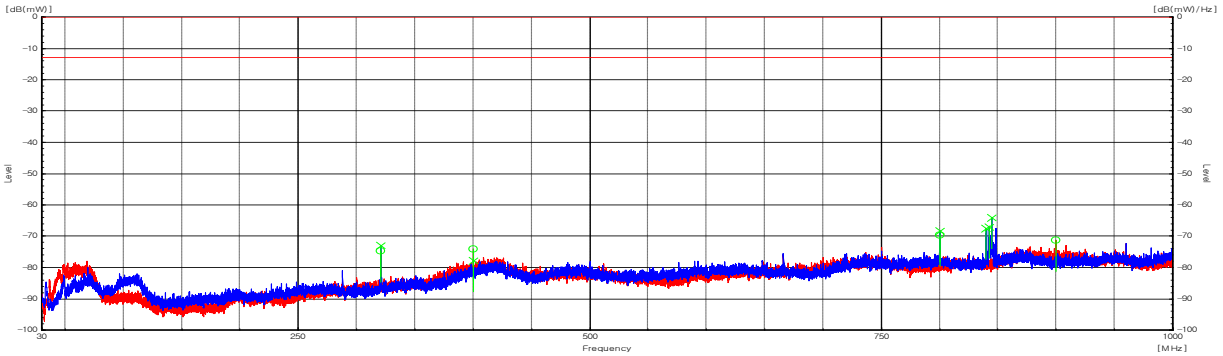


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
320.67	V	-69.5	-3.1	-72.6	-13	59.6	
320.67	H	-72.5	-2.4	-74.9	-13	61.9	
400.02	H	-75.9	1.5	-74.4	-13	61.4	
400.02	V	-76.5	-0.2	-76.7	-13	63.7	
800.04	V	-72.9	5.2	-67.7	-13	54.7	
800.04	H	-73.2	3.7	-69.5	-13	56.5	
960.10	H	-79.8	6.4	-73.4	-13	60.4	
960.10	V	-78.8	6.4	-72.4	-13	59.4	

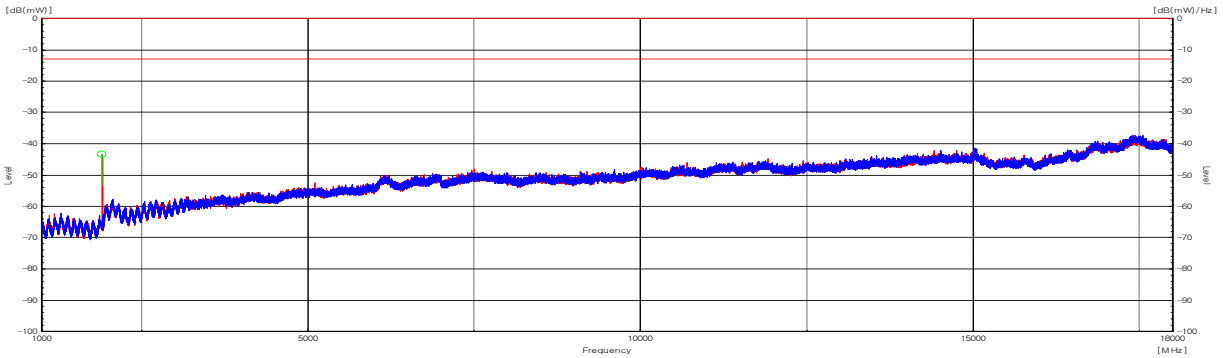


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
1879.70	H	-51.1	4.0	-47.1	-13	34.1	carrier

Channel : High



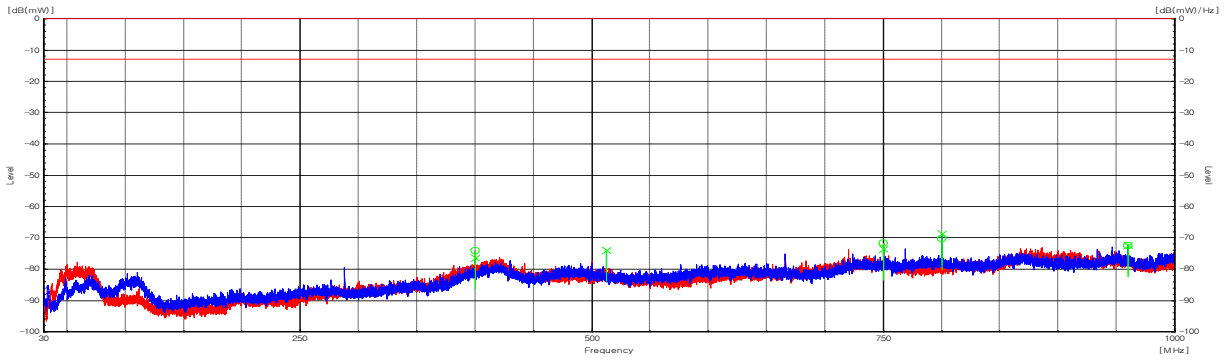
Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
320.67	V	-69.9	-3.1	-73.0	-13	60.0	
320.67	H	-72.4	-2.4	-74.8	-13	61.8	
400.02	V	-77.5	-0.2	-77.7	-13	64.7	
400.02	H	-75.7	1.5	-74.2	-13	61.2	
799.99	H	-73.5	3.7	-69.8	-13	56.8	
800.04	V	-73.5	5.2	-68.3	-13	55.3	
839.99	V	-71.9	4.5	-67.4	-13	54.4	
842.54	V	-71.8	4.6	-67.2	-13	54.2	
844.49	V	-68.7	4.7	-64.0	-13	51.0	
900.05	H	-78.4	7.0	-71.4	-13	58.4	



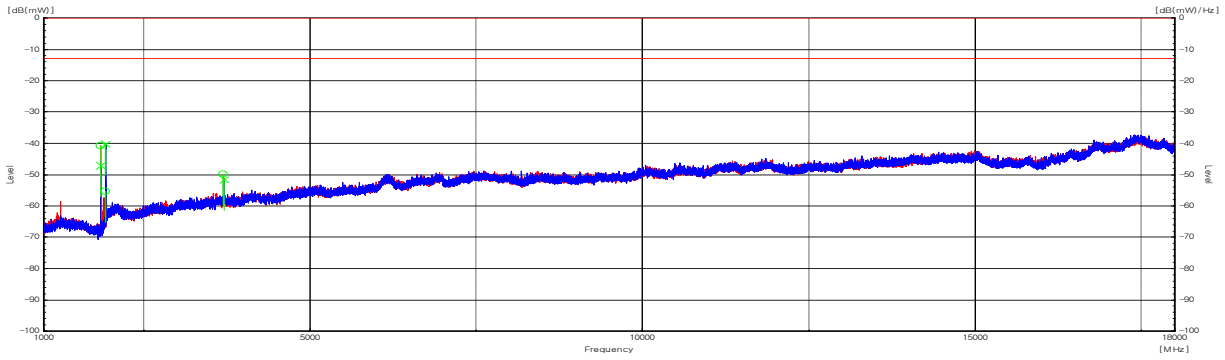
Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
1909.36	H	-48.5	5.1	-43.4	-13	30.4	carrier

[Mode 3 : WCDMA Band II]

Channel : Low

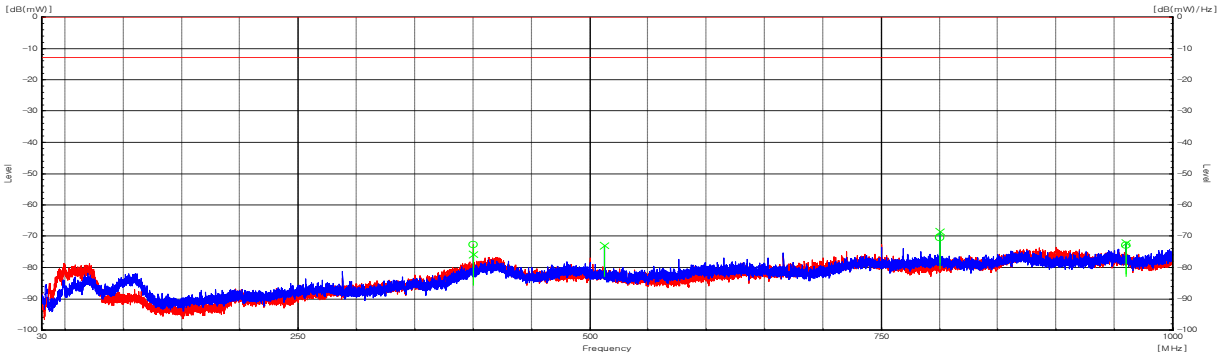


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
399.97	H	-75.7	1.5	-74.2	-13	61.2	
400.02	V	-76.2	-0.2	-76.4	-13	63.4	
512.58	V	-74.8	0.8	-74.0	-13	61.0	
749.99	H	-76.7	4.9	-71.8	-13	58.8	
749.99	V	-78.1	4.5	-73.6	-13	60.6	
799.99	V	-73.9	5.2	-68.7	-13	55.7	
800.04	H	-74.0	3.7	-70.3	-13	57.3	
960.10	H	-79.0	6.4	-72.6	-13	59.6	
960.10	V	-78.7	6.4	-72.3	-13	59.3	

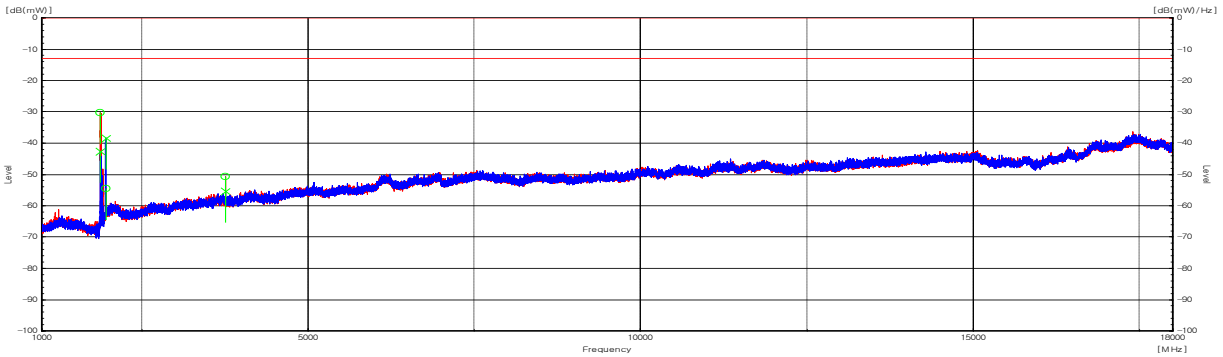


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
1850.76	H	-44.1	3.3	-40.8	-13	27.8	carrier(TX)
1851.48	V	-50.3	3.3	-47.0	-13	34.0	carrier(TX)
1931.06	H	-61.5	6.2	-55.3	-13	42.3	carrier(RX)
1933.23	V	-46.8	6.5	-40.3	-13	27.3	carrier(RX)
3702.75	H	-61.9	12.0	-49.9	-13	36.9	
3707.09	V	-63.9	12.4	-51.5	-13	38.5	

Channel : Middle

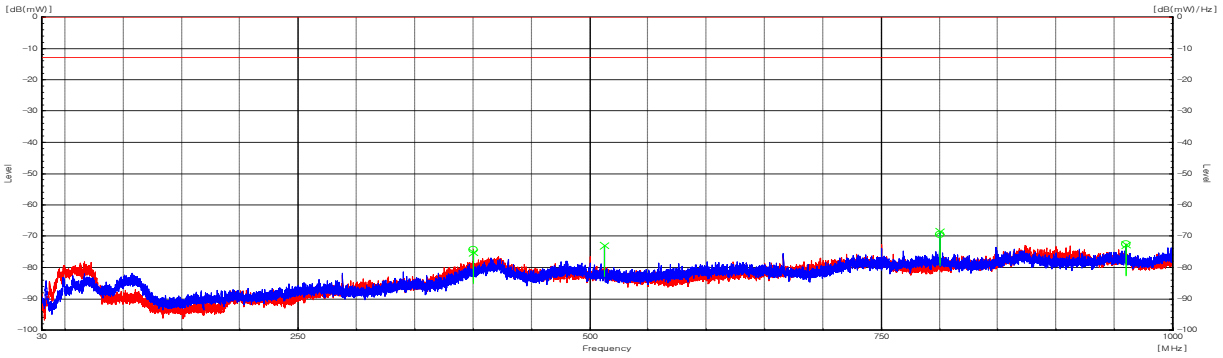


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
399.97	H	-74.2	1.5	-72.7	-13	59.7	
400.02	V	-75.7	-0.2	-75.9	-13	62.9	
512.58	V	-73.8	0.8	-73.0	-13	60.0	
799.99	V	-73.8	5.2	-68.6	-13	55.6	
799.99	H	-74.3	3.7	-70.6	-13	57.6	
960.10	H	-79.4	6.4	-73.0	-13	60.0	
960.10	V	-78.5	6.4	-72.1	-13	59.1	

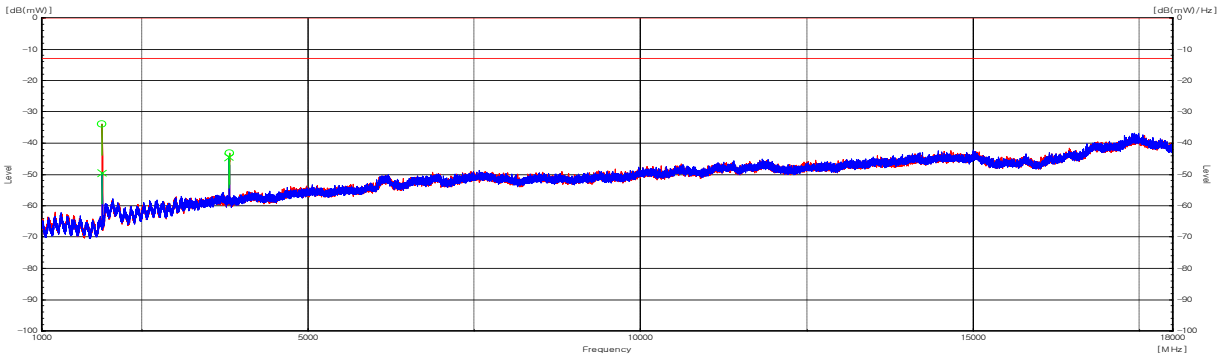


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
1881.14	V	-46.8	4.1	-42.7	-13	29.7	Carrier(TX)
1881.87	H	-34.4	4.0	-30.4	-13	17.4	Carrier(TX)
1959.99	V	-46.2	7.8	-38.4	-13	25.4	Carrier(RX)
1960.72	H	-62.2	7.6	-54.6	-13	41.6	Carrier(RX)
3757.73	H	-62.6	11.8	-50.8	-13	37.8	
3758.46	V	-67.5	12.1	-55.4	-13	42.4	

Channel : High



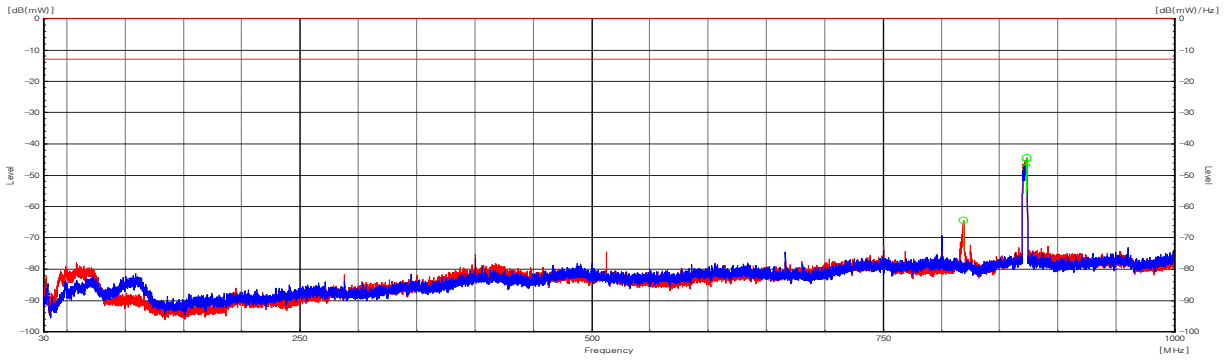
Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
399.97	V	-74.8	-0.3	-75.1	-13	62.1	
399.97	H	-75.9	1.5	-74.4	-13	61.4	
512.58	V	-73.8	0.8	-73.0	-13	60.0	
800.04	H	-73.2	3.7	-69.5	-13	56.5	
800.04	V	-73.7	5.2	-68.5	-13	55.5	
960.10	H	-79.0	6.4	-72.6	-13	59.6	
960.10	V	-79.2	6.4	-72.8	-13	59.8	



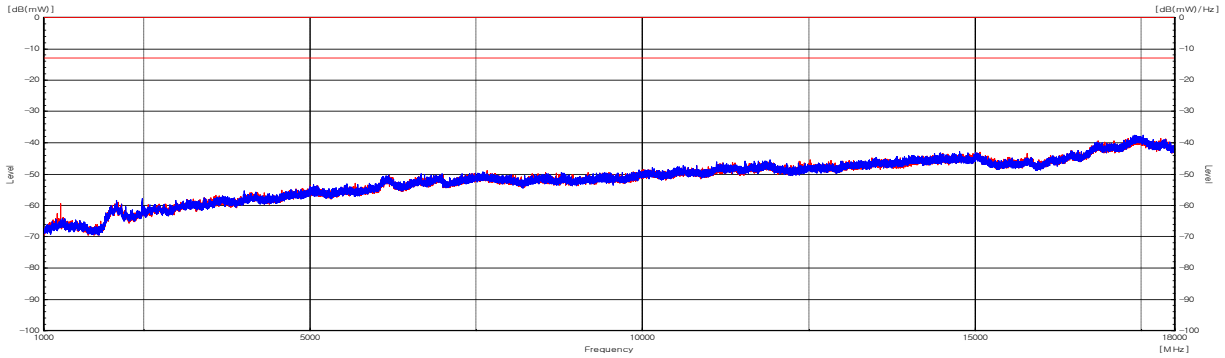
Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
1906.46	V	-54.5	5.1	-49.4	-13	36.4	carrier
1907.91	H	-39.0	5.0	-34.0	-13	21.0	carrier
3814.16	V	-56.4	11.9	-44.5	-13	31.5	
3817.78	H	-54.9	11.7	-43.2	-13	30.2	

[Mode 4 : WCDMA Band V]

Channel : Low



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
818.89	H	-69.3	4.8	-64.5	-13	51.5	
872.29	V	-52.8	6.7	-46.1	-13	33.1	Carrier(RX)
872.94	H	-52.0	7.5	-44.5	-13	31.5	Carrier(RX)



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
Not detected							

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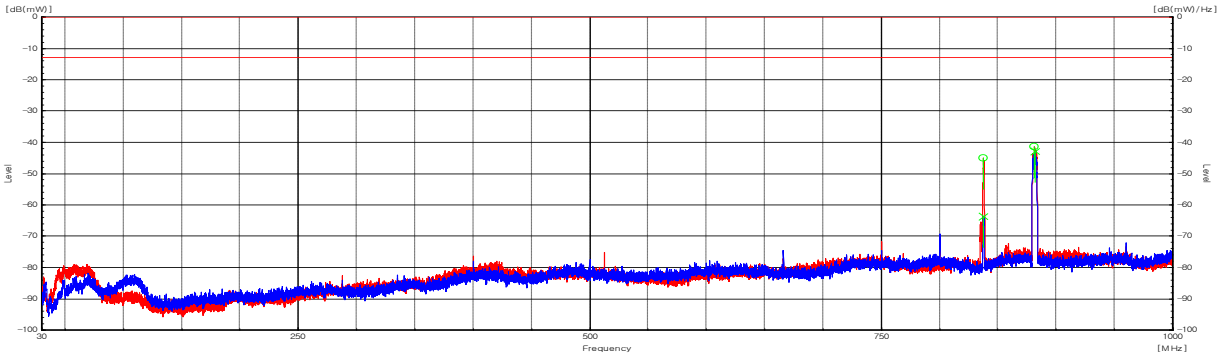
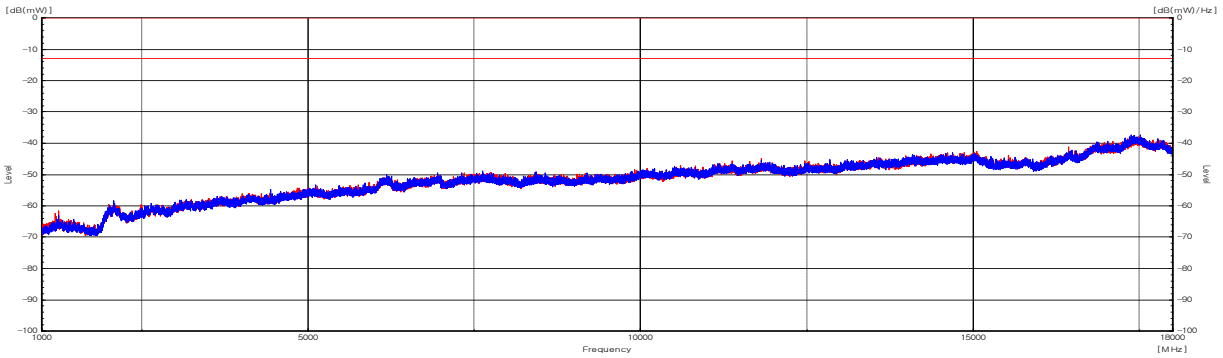
(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Channel : Middle

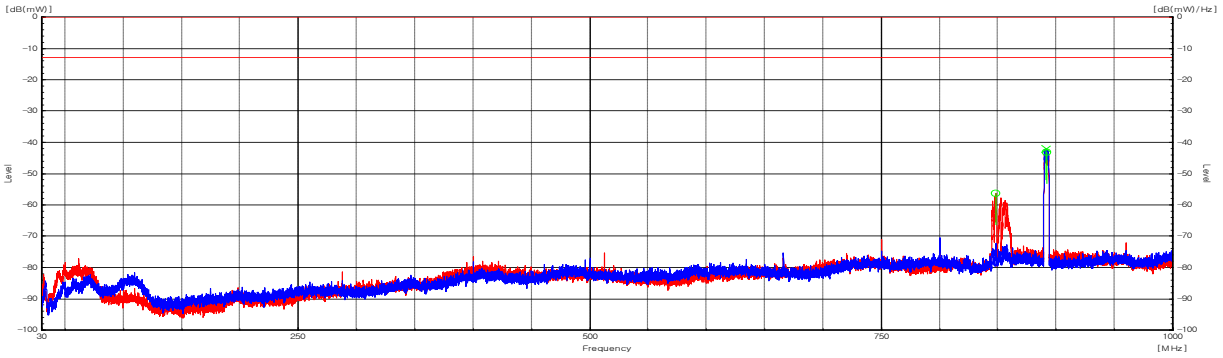


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
837.69	V	-68.0	4.4	-63.6	-13	50.6	carrier(TX)
837.74	H	-49.5	4.4	-45.1	-13	32.1	carrier(TX)
881.49	H	-48.8	7.4	-41.4	-13	28.4	carrier(RX)
882.04	V	-48.9	6.0	-42.9	-13	29.9	carrier(RX)

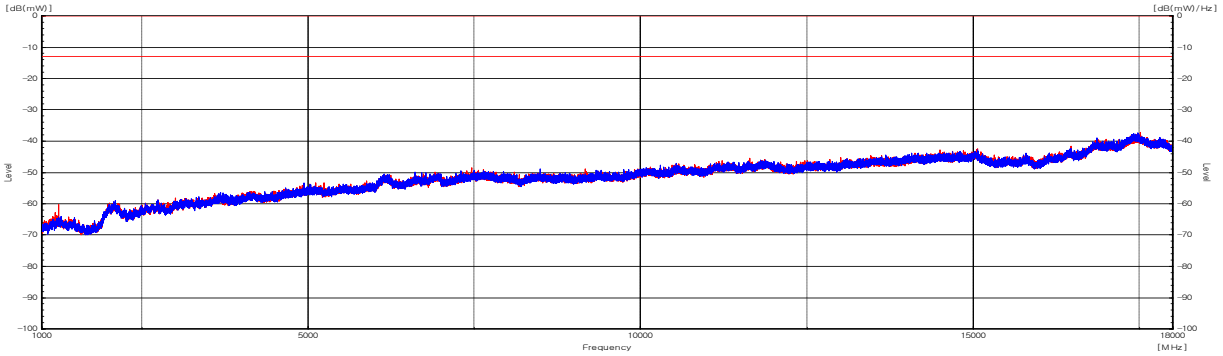


Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
Not detected							

Channel : High



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	ERP[dBm]	Limit[dBm]	Margin[dB]	Remark
848.29	H	-61.2	4.8	-56.4	-13	43.4	carrier(TX)
891.34	V	-47.7	5.6	-42.1	-13	29.1	carrier(RX)
892.19	H	-50.6	7.3	-43.3	-13	30.3	carrier(RX)



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	EIRP[dBm]	Limit[dBm]	Margin[dB]	Remark
Not detected							

APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2018-02-01	2019-02-01
2	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2017-10-25	2018-10-25
3	Signal Generator	Rohde & Schwarz	SMB100A	175528	2017-11-01	2018-11-01
4	Bilog Antenna	Schaffner	CBL6111C	2551	2018-05-10	2020-05-10
5	6dB Attenuator	Rohde & Schwarz	DNF	272.4110.50-2	2017-10-25	2018-10-25
6	AMPLIFIER	SONOMA	310	291721	2018-02-02	2019-02-02
7	Horn Antenna	ETS-Lindgren	3116	00062504	2017-12-04	2019-12-04
8	Horn Antenna	ETS-Lindgren	3117	00154525	2017-09-14	2019-09-14
9	Preamplifier	Agilent	8449B	3008A02011	2017-11-30	2018-11-30