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## CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea

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# TEST REPORT For FCC

Test Report No. : CTK-2016-01125

Date of Issue : 2016-09-05

FCC ID : 2AJOX-CTD-S100

Model/Type No. : CTD-S100

Kind of Product : Container Tracer Device

Rule Part(s) : FCC 47 CFR PART 2, Subpart J  
FCC 47 CFR PART 22, Subpart H  
FCC 47 CFR PART 24, Subpart E  
FCC 47 CFR PART 27

TX Frequency Range : 824 - 849 MHz / 1850 - 1910 MHz / 1710 - 1755 MHz

RX Frequency Range : 869 - 894 MHz / 1930 - 1990 MHz / 2110 - 2155 MHz

Applicant : S-winnus Co., Ltd

Applicant Address : CVT bldg.3F306, 41, Centum dong-ro, Haeundae-Gu, Busan,  
Korea (ZIP 48059)

Manufacturer : S-winnus Co., Ltd

Manufacturer Address : CVT bldg.3F306, 41, Centum dong-ro, Haeundae-Gu, Busan,  
Korea (ZIP 48059)

Contact Person : Jang Young Chul

Telephone : +82-51-747-8935

Received Date : 2016-07-21

Test period : Start : 2016-08-09 End : 2016-08-31

Test Results : ☒ In Compliance ☐ Not in Compliance

The test results presented in this report relate only to the object tested.

Tested by

Y. T. Lee

Young-taek, Lee  
Test Engineer  
Date: 2016-09-05

Reviewed by

Y. J. Park

Young-Joon, Park  
Technical Manager  
Date: 2016-09-05



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### REPORT REVISION HISTORY

Date	Revision	Page No
2016-09-05	Issued (CTK-2016-01125)	all

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### 1.0 General Product Description

Product Description		Container Tracer Device		
Model name		CTD-S100		
Serial number		Identical prototype		
EUT condition		Pre-production, not damaged		
GSM/WCDMA Module		Manufacturer : Telit Communications S.p.A.		
		FCC ID : RI7HE910		
Mode	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
		IV	1712.4 - 1752.6	2112.4 - 2152.6
RF output power (Module Grant reference)	GSM	Band 850 : 1.995 W (33 dBm) Band 1900 : 0.993 W (29.97 dBm)		
	WCDMA	Band II : 0.243 W (23.86 dBm) Band V : 0.446 W (26.49 dBm) Band IV : 0.226 W (23.54 dBm)		
Antenna Type		PIFA		
Antenna Gain		Band 850 : -0.69 dBi Band 1900 : 2.84 dBi		
Modulation	GSM	GMSK		
	WCDMA	QPSK		
Power Source		3.7 Vdc (Rechargeable Li-ion Battery)		



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### 1.1 Mode of Operation

Test Mode
Mode 1 : GPRS 850 Link
Mode 2 : GPRS 1900 Link
Mode 3 : WCDMA Band II Link
Mode 4 : WCDMA Band V Link
Mode 5 : WCDMA Band IV 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.
- Equipment makes use of approved GSM/WCDMA Module.
- Product cannot be used for voice-communication.

### Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system(including inserted cards) are:

Product	Manufacturer	Model Number	Serial Number
Wideband Radio Communication Tester	R&S	CMW500	114635

### 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
WCDMA Band IV	Channel	1312	1450	1513
	Frequency [MHz]	1712.4	1740.0	1752.6

## 1.2 Model Differences

Not applicable

## 1.3 Device Modifications

The following modifications were necessary for compliance:

Not applicable





## 1.4 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.

## 1.5 Test Facility

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

## 1.6 Laboratory Accreditations and Listings

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



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## 2.0 Summary of tests

FCC Rule	Test Parameter	Test Condition	Status (note1)
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### I. FCC Part Section(s)

GSM/WCDMA 850&1900 Terminal equipment is certified by FCC(FCC ID: RI7HE910)

### II. Additional items

2.1053, 22.917, 24.238, 27.53	Field Strength of Harmonics	Radiated	C
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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.

The sample was tested according to the following specification:  
KDB 971168 D01 Power Meas License Digital System v02r02  
ANSI/TIA-603-D-2010



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## 2.1 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.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

Out of band emissions. 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 limits.

On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log(P)$  dB.





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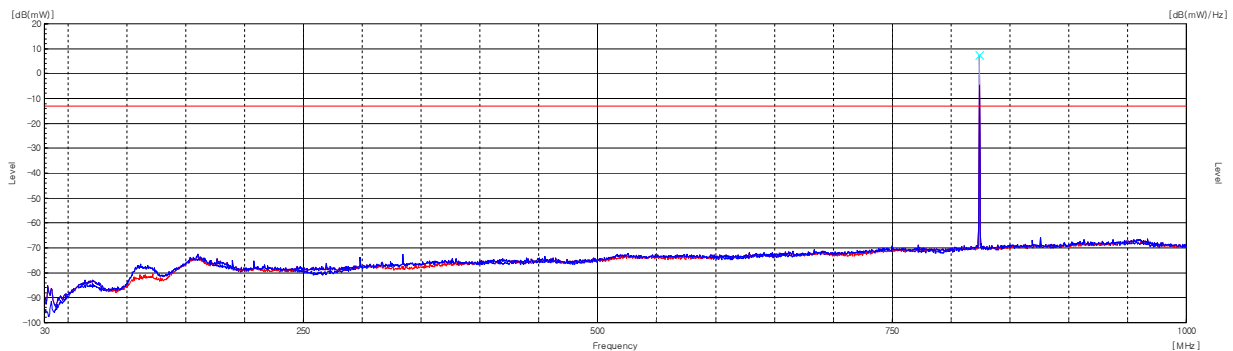
### Test Results

The requirements are: ☒ Complies

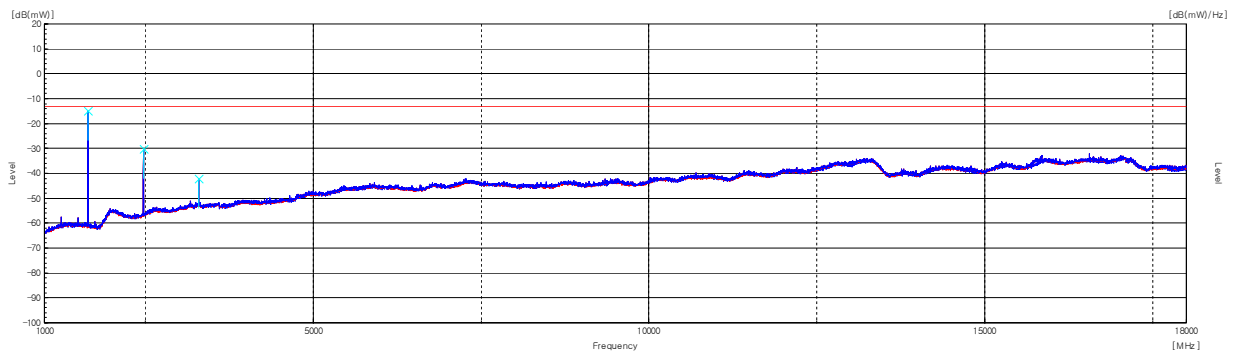
### Test Data

[Mode 1 : GSM 850]

Channel : 128



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
824.24	V	1.4	6.1	7.5	-13	-20.5	Carrier



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1648.13	V	-19.8	4.8	-15	-13	2.0	
2472.63	V	-38.1	7.8	-30.3	-13	17.3	
3297.13	V	-53.3	11.1	-42.2	-13	29.2	

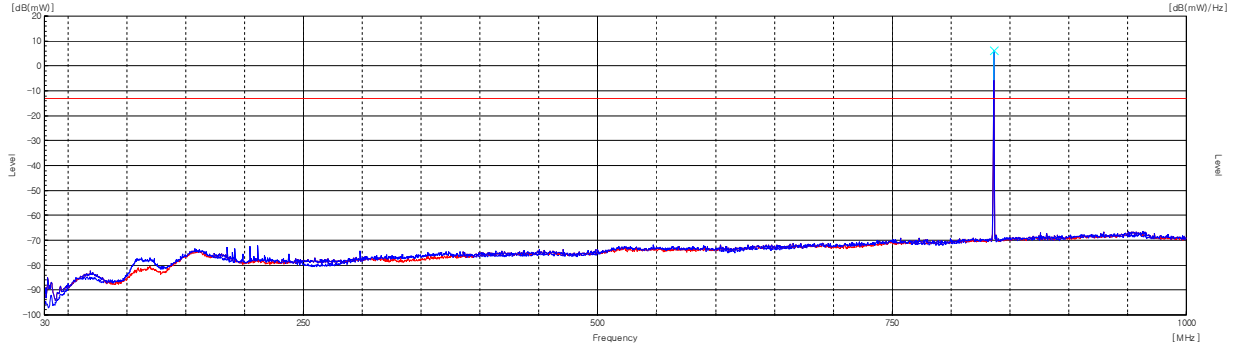


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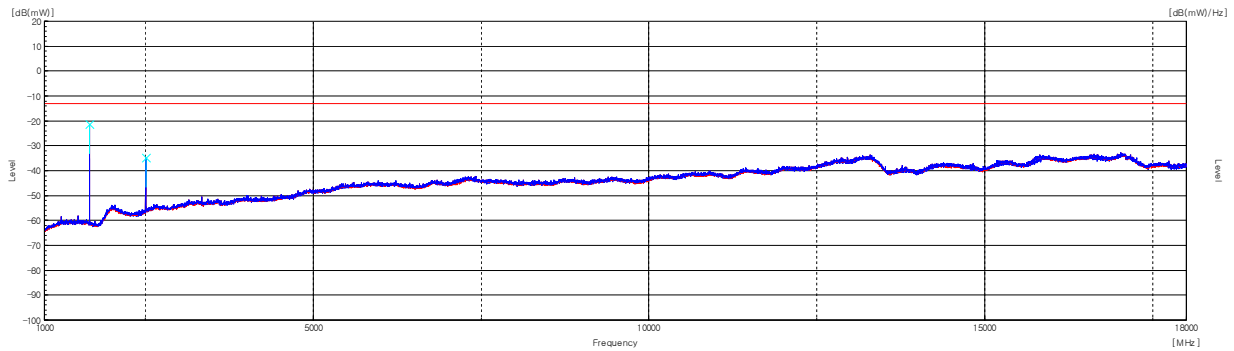
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## Channel : 189



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
836.26	V	0.1	6.2	6.3	-13	-19.3	Carrier



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1671.50	V	-26.1	4.7	-21.4	-13	8.4	
2508.75	V	-43.0	8.1	-34.9	-13	21.9	



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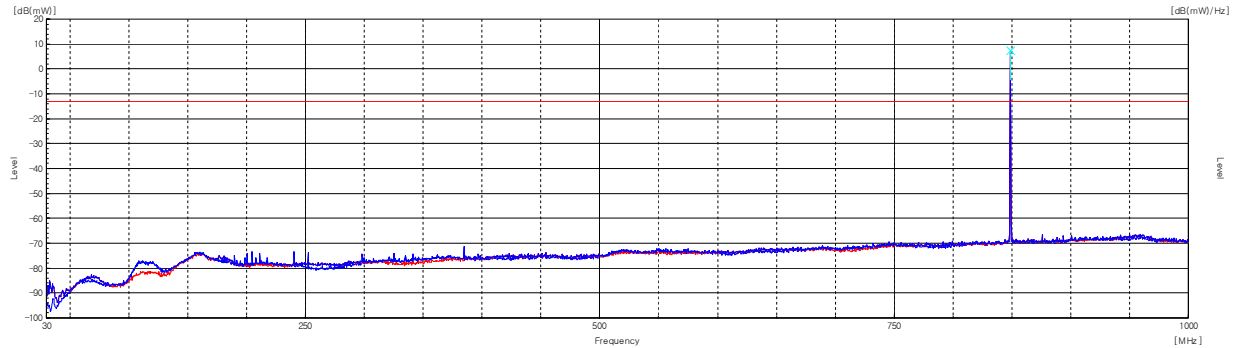
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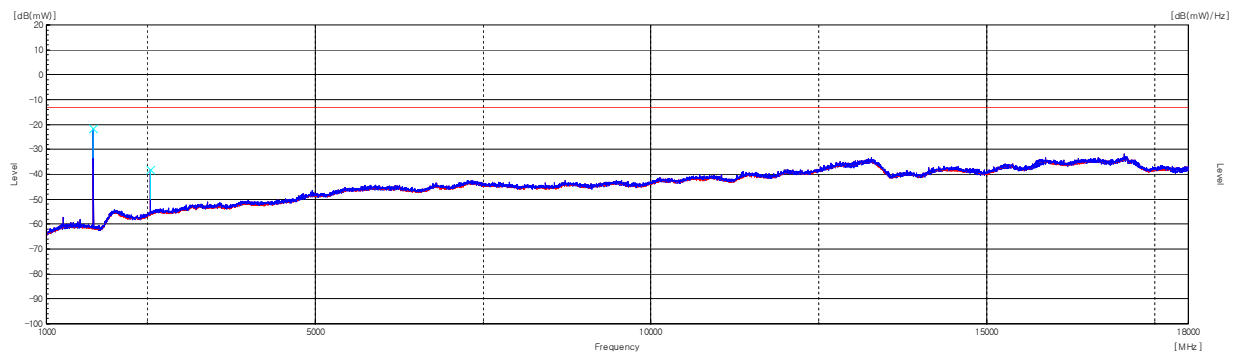
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### Channel : 251



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
848.68	V	0.5	6.8	7.3	-13	-20.3	Carrier



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1697.00	V	-26.1	4.5	-21.6	-13	8.6	
2547.00	V	-46.7	8.5	-38.2	-13	25.2	



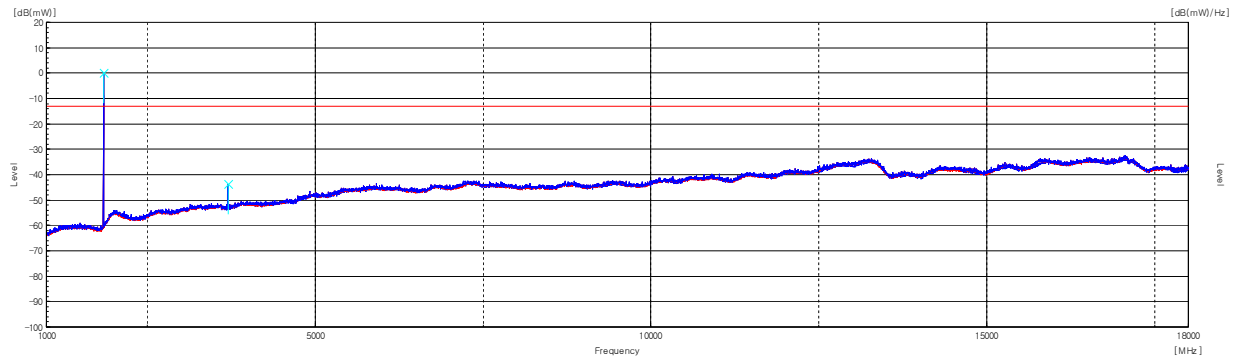
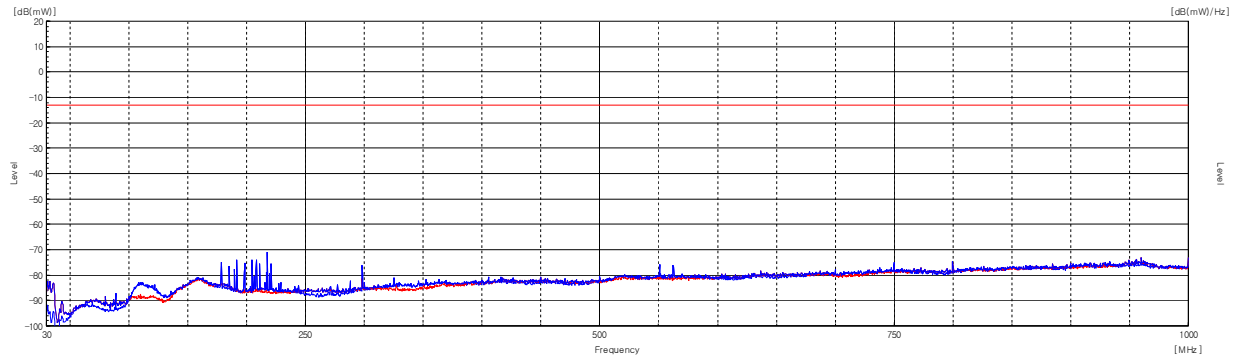
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[Mode 2 : GSM 1900]

Channel : 512



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1850.00	V	-5.2	5.2	0	-13	-13.0	Carrier
3700.88	V	-56.3	12.7	-43.6	-13	30.6	



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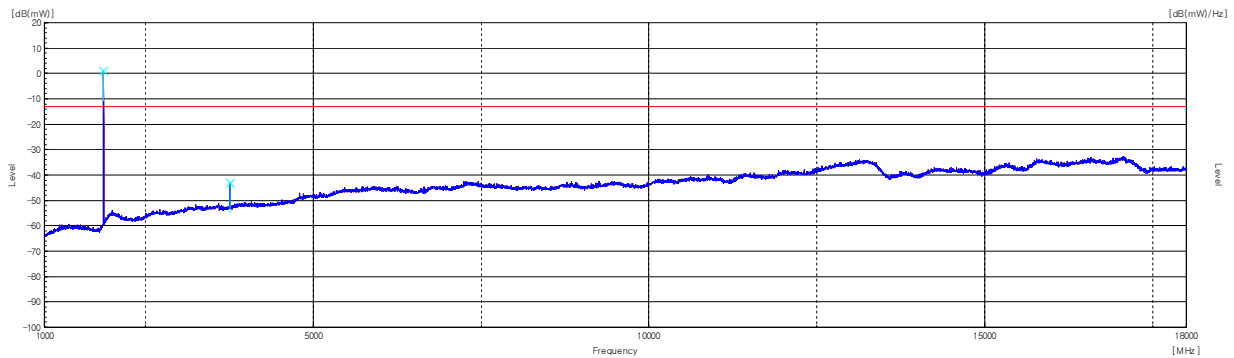
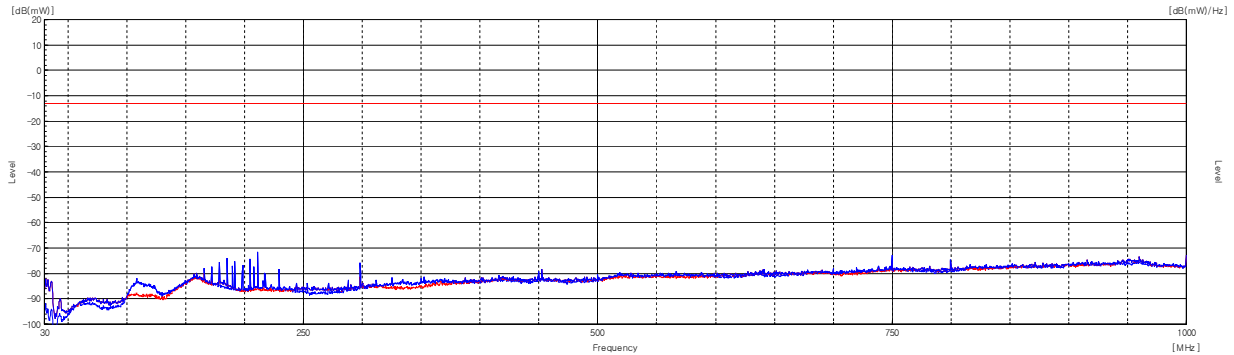
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### Channel : 661



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1879.75	V	-5.2	6.3	1.1	-13	-14.1	Carrier
3760.38	V	-55.9	12.9	-43	-13	30.0	

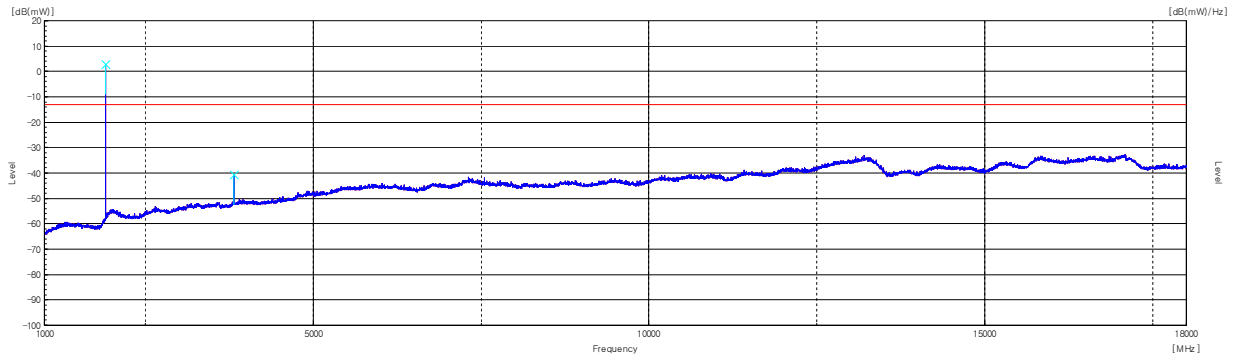
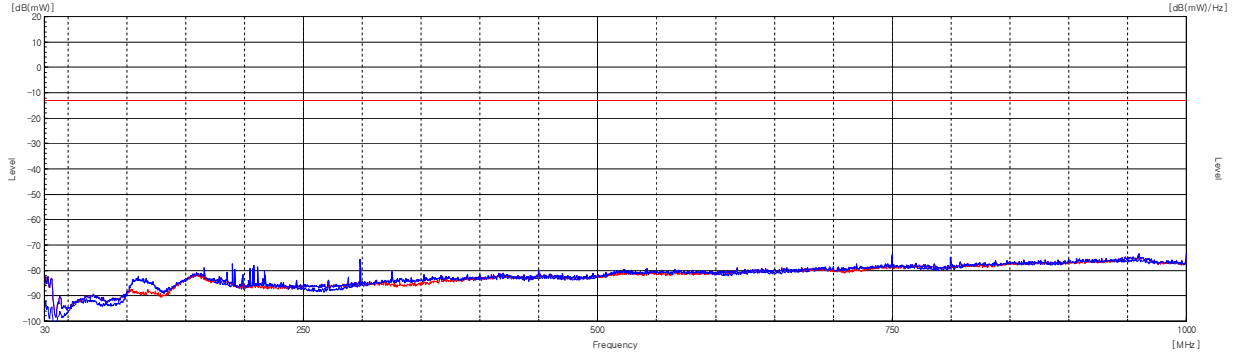


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## Channel : 810



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1909.50	V	-4.8	7.7	2.9	-13	-15.9	Carrier
3819.88	V	-53.7	13.2	-40.5	-13	27.5	



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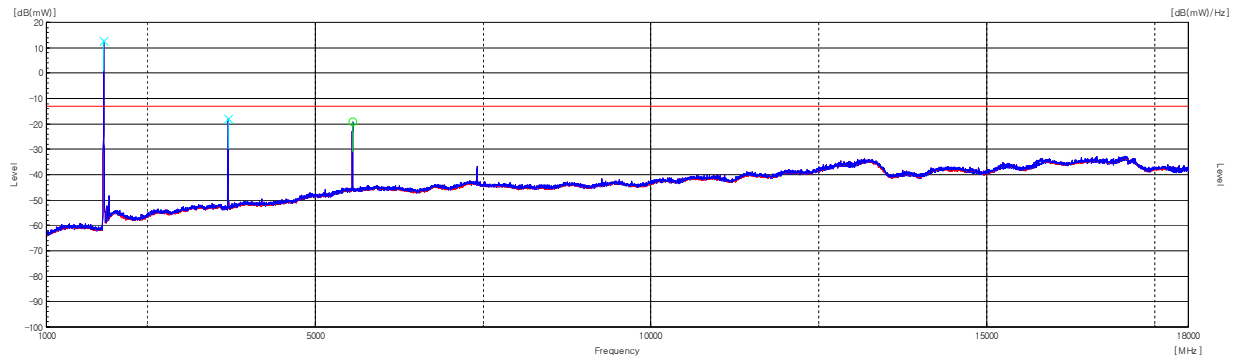
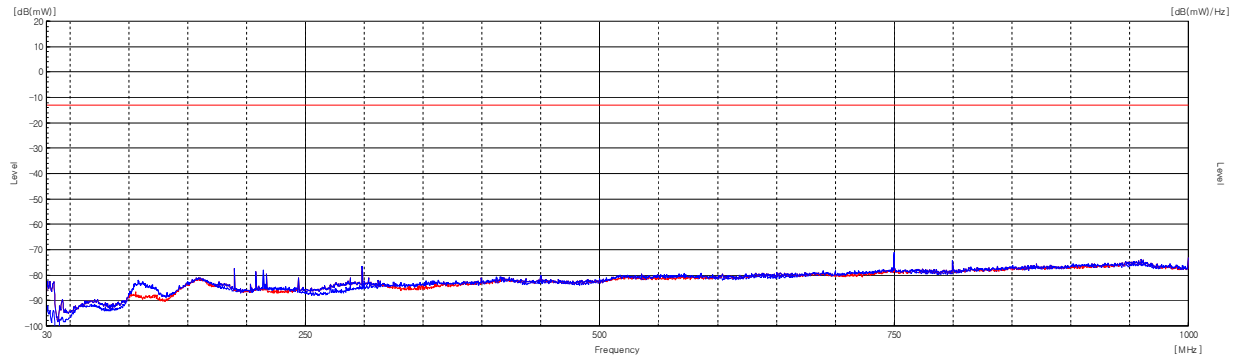
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### [Mode 3 : WCDMA Band II]

Channel : 9262



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1852.125	V	7.5	5.2	12.7	-13	-25.7	Carrier
3707.25	V	-30.5	12.7	-17.8	-13	4.8	
5560.25	H	-37.4	18.3	-19.1	-13	6.1	



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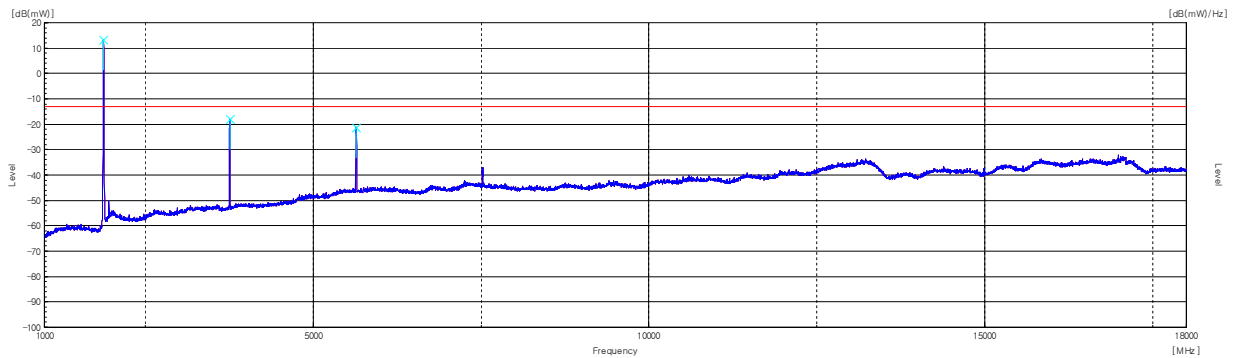
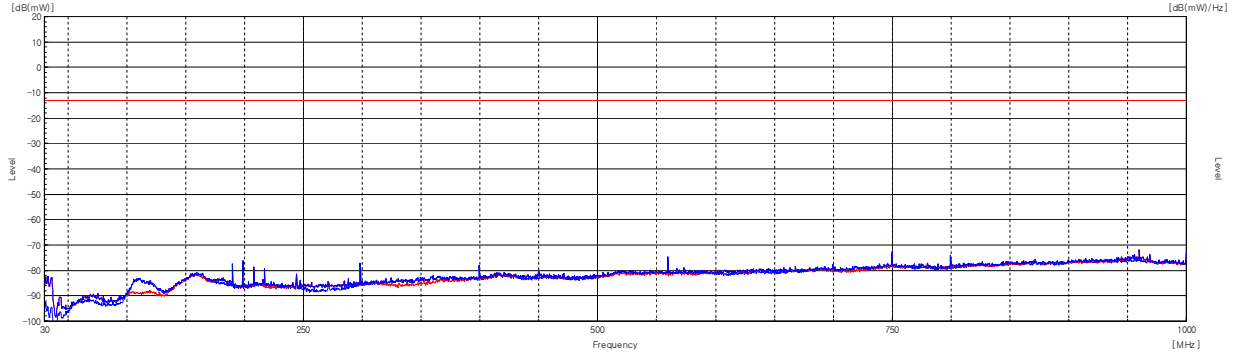
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### Channel : 9400



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1879.75	V	7.0	6.3	13.3	-13	-26.3	Carrier
3758.25	V	-30.9	12.9	-18.0	-13	5.0	
5636.75	V	-39.7	18.4	-21.3	-13	8.3	





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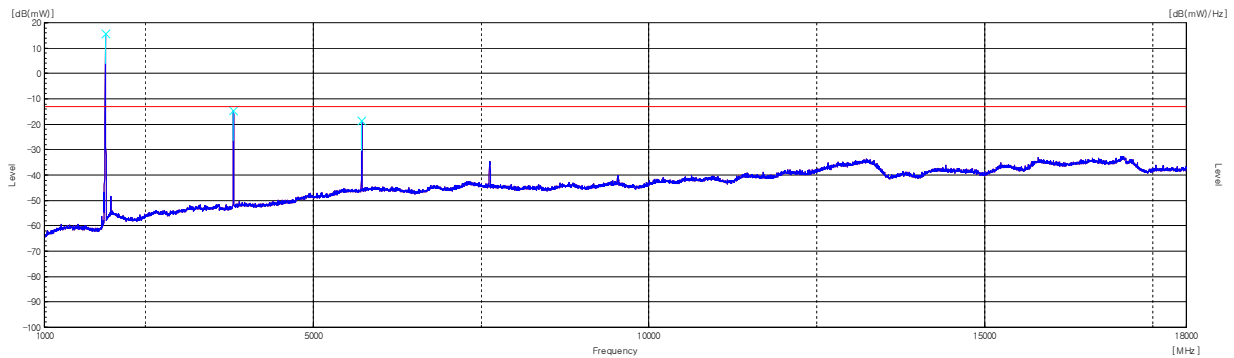
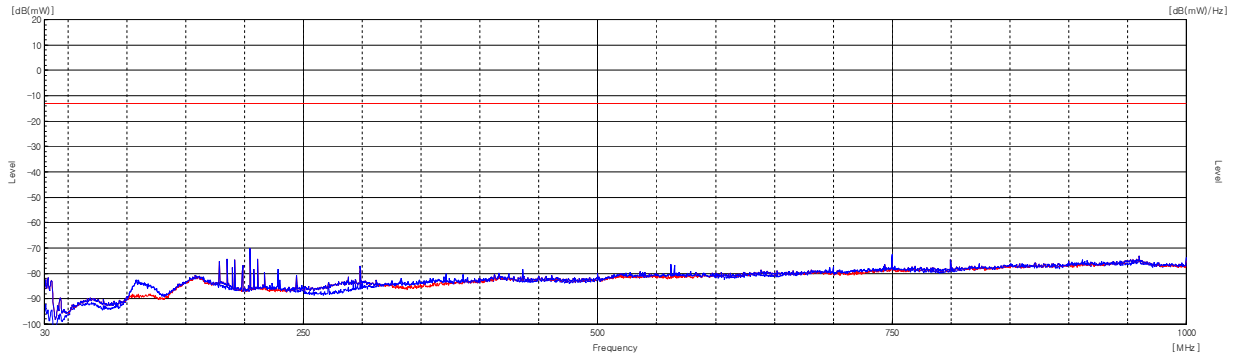
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### Channel : 9538



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1907.38	V	8.1	7.6	15.7	-13	-28.7	Carrier
3813.50	V	-27.7	13.2	-14.5	-13	1.5	
5719.63	V	-36.9	18.4	-18.5	-13	5.5	



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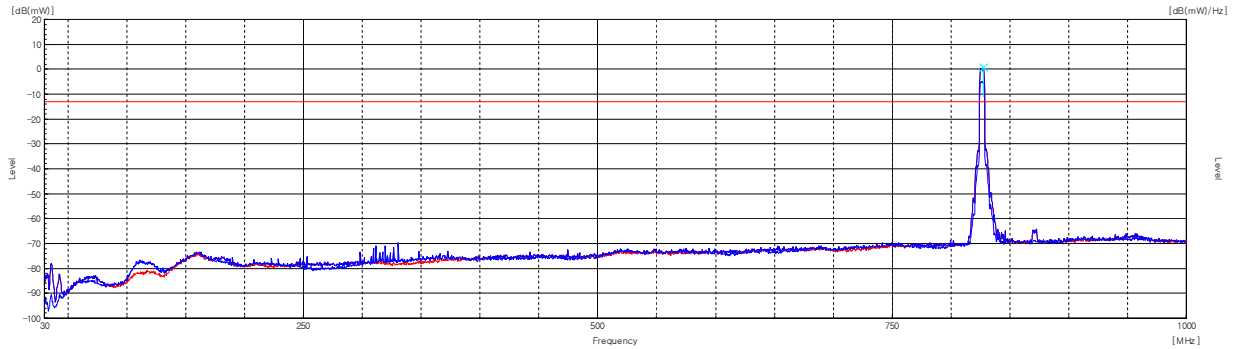
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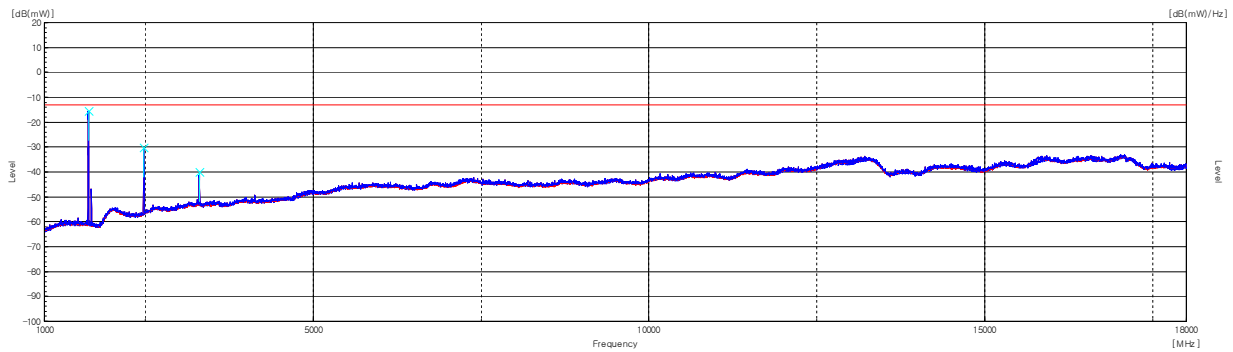
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### [Mode 4 : WCDMA Band V]

Channel : 4132



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
827.73	V	-5.5	6.1	0.6	-13	-13.6	Carrier



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1654.50	V	-20.2	4.8	-15.4	-13	2.4	
2481.13	V	-37.9	7.8	-30.1	-13	17.1	
3309.88	V	-51.0	11.1	-39.9	-13	26.9	



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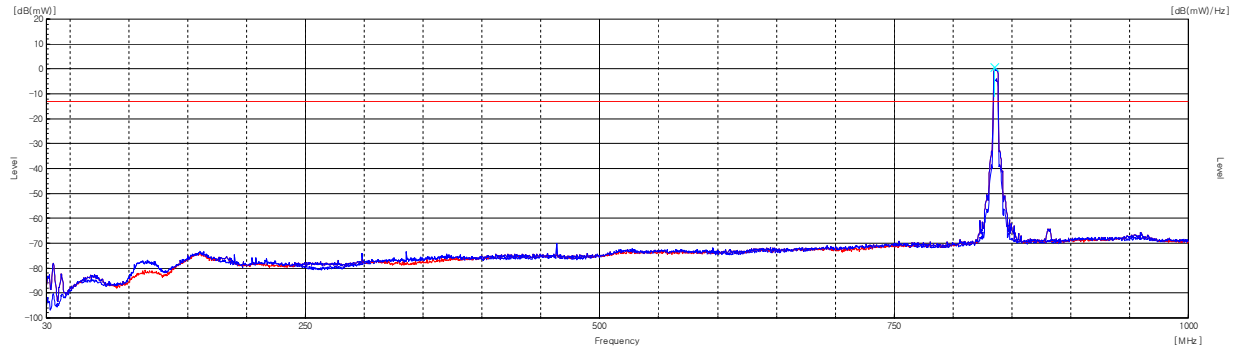
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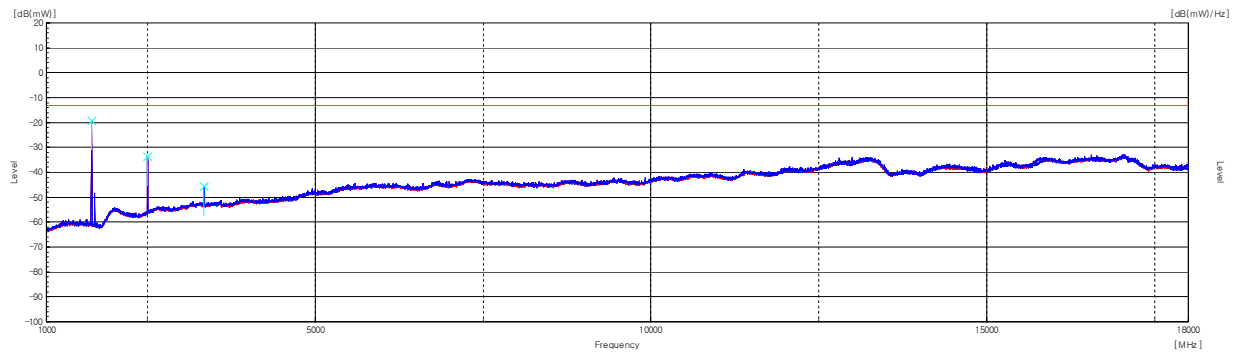
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### Channel : 4182



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
835.49	V	-5.3	6.1	0.8	-13	-13.8	Carrier



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1671.50	V	-23.8	4.7	-19.1	-13	6.1	
2506.63	V	-41.6	8.1	-33.5	-13	20.5	
3341.75	V	-56.9	11.3	-45.6	-13	32.6	



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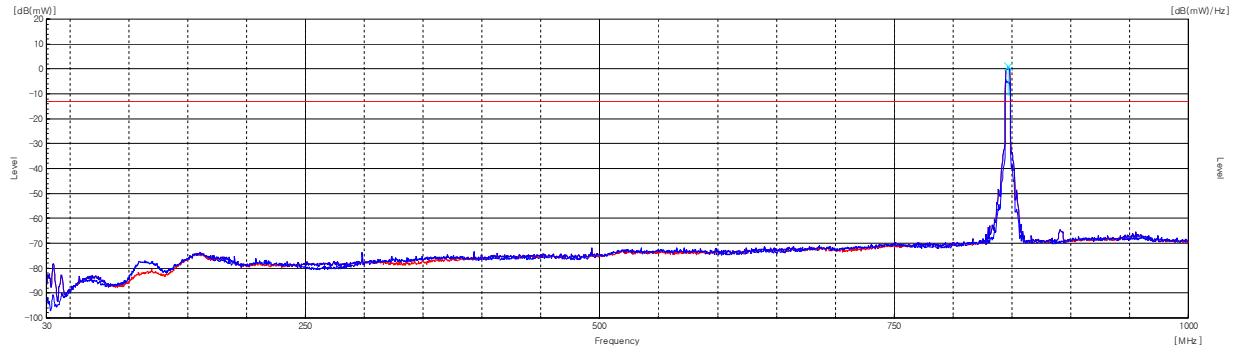
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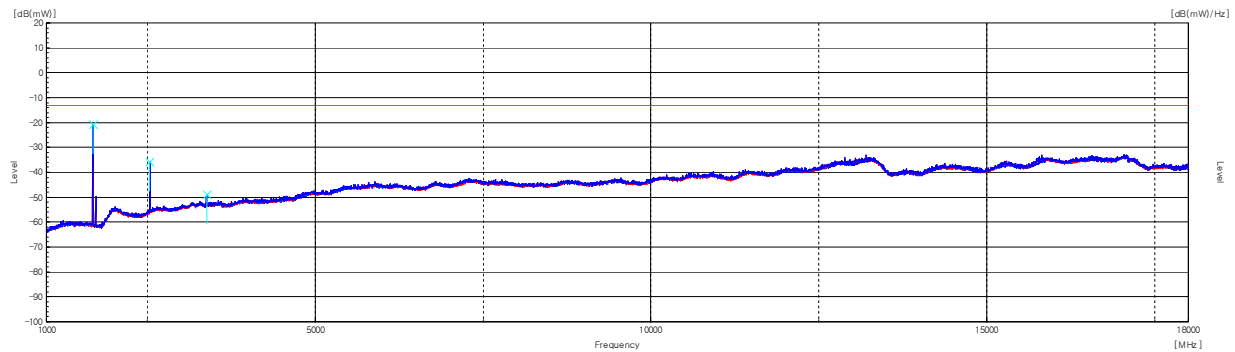
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### Channel : 4233



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
846.74	V	-5.7	6.7	1.0	-13	-14.0	Carrier



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1690.63	V	-25.2	4.6	-20.6	-13	7.6	
2536.38	V	-44.0	8.4	-35.6	-13	22.6	
3390.63	V	-60.3	11.5	-48.8	-13	35.8	



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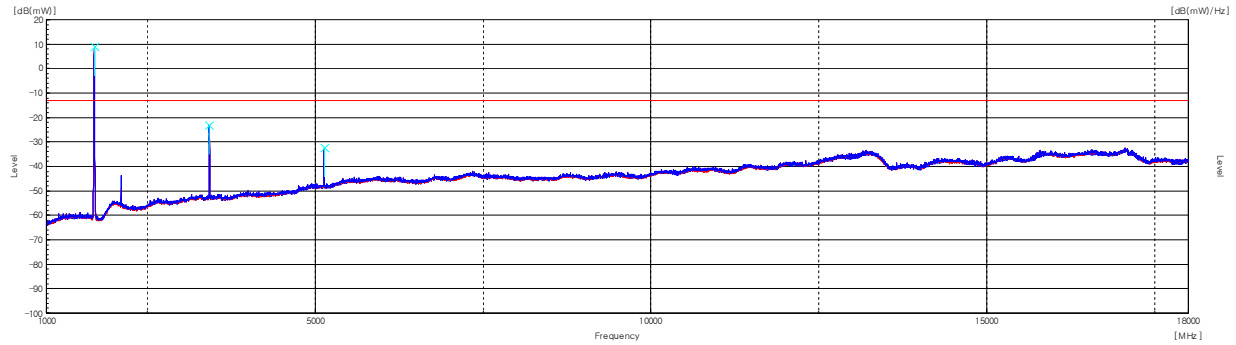
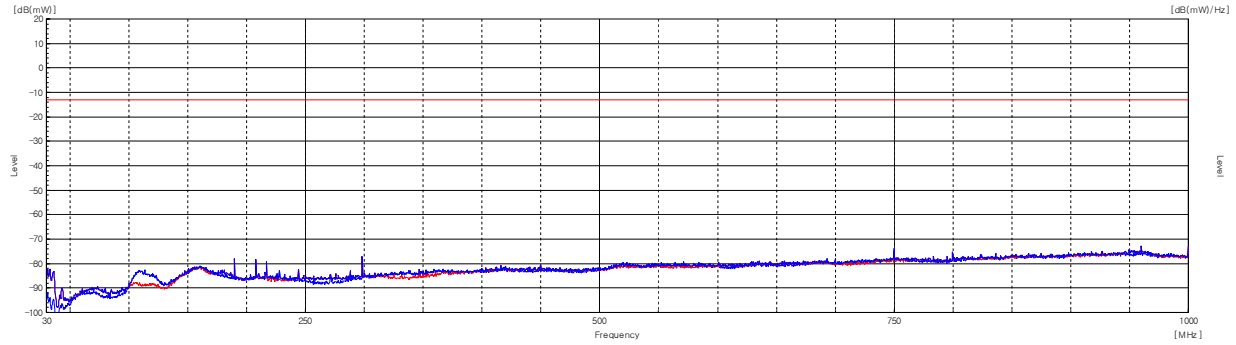
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### [Mode 5 : WCDMA Band IV]

#### Channel : 1312



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1711.88	V	4.5	4.5	9.0	-13	-22.0	Carrier
3426.75	V	-34.9	11.7	-23.2	-13	10.2	
5139.50	V	-48.6	16.4	-32.2	-13	19.2	



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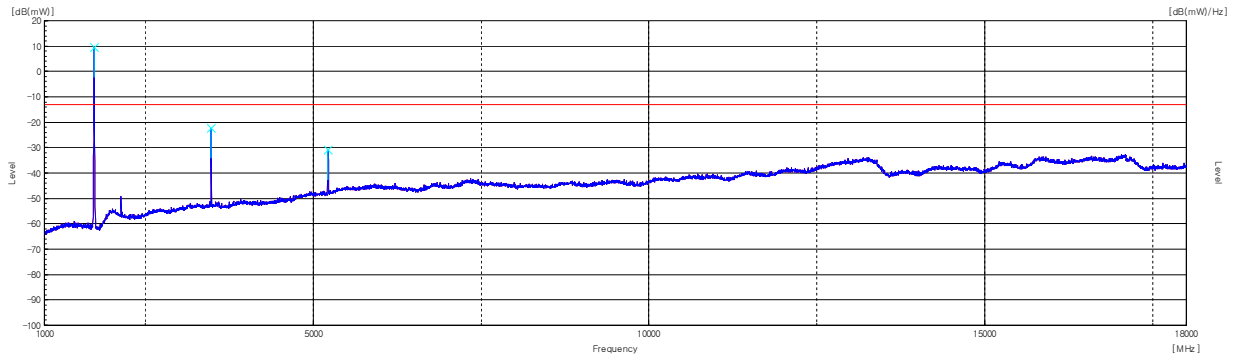
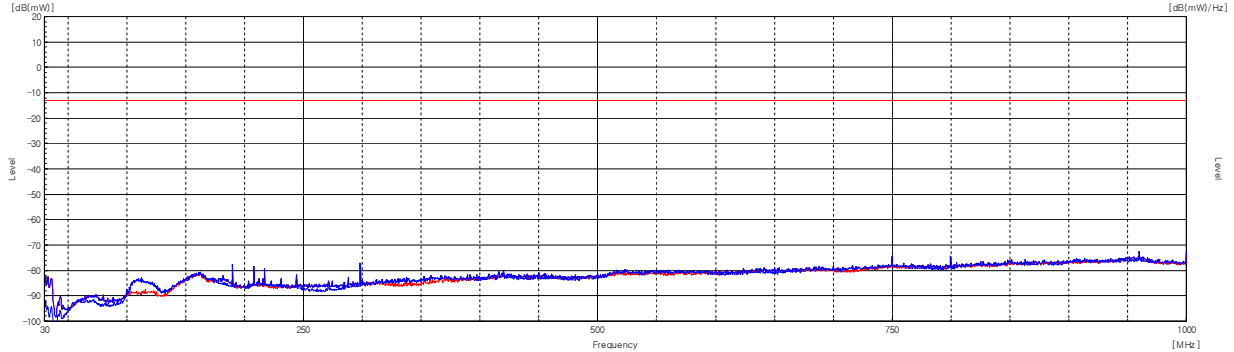
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### Channel : 1450



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1739.5	V	5.1	4.4	9.5	-13	-22.5	Carrier
3482.0	V	-34.2	11.9	-22.3	-13	9.3	
5216.0	V	-47.2	16.4	-30.8	-13	17.8	

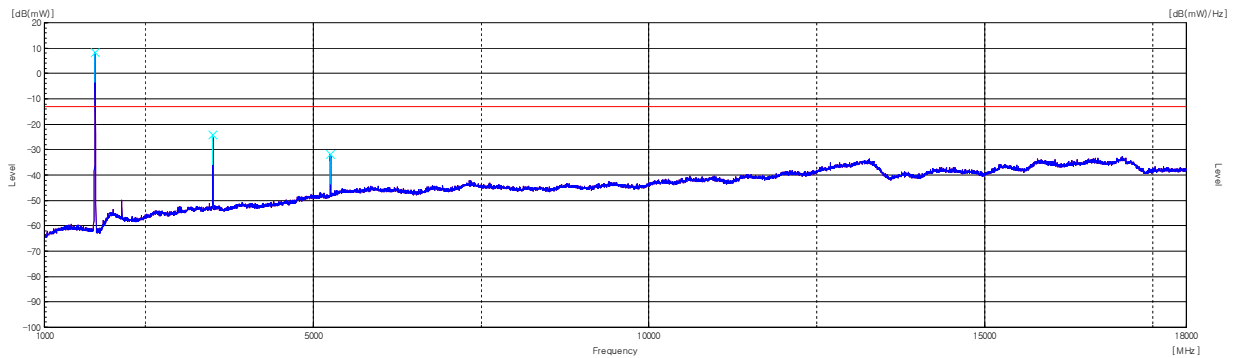
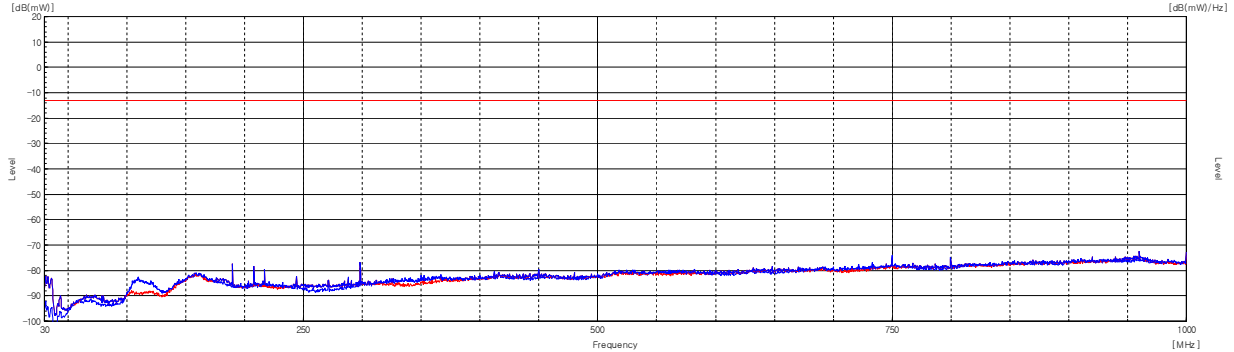


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## Channel : 1513



Frequency [MHz]	Pol.	Reading [dBm]	Space Loss [dB]	Level[dBm]	Limit[dBm]	Margin[dB]	Remark
1752.25	V	4.0	4.3	8.3	-13	-21.3	Carrier
3503.25	V	-36.0	12.0	-24.0	-13	11.0	
5254.25	V	-48.3	16.5	-31.8	-13	18.8	



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### APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
1	MXA Signal Analyzer	Agilent	N9020A	MY50510324	2017-03-11
2	EMI Test Receiver	R&S	ESCI7	100814	2016-11-02
3	EMI Test Receiver	R&S	ESU40	100336	2107-05-14
4	Bilog Antenna	Schaffner	CBL6111C	2551	2018-05-13
5	6dB Attenuator	R&S	DNF	272.4110.50-1	2017-02-04
6	AMPLIFIER	SONOMA	310	291721	2017-02-02
7	Horn Antenna	ETS-Lindgren	3115	00078894	2017-09-02
8	Horn Antenna	ETS-Lindgren	3115	00078895	2017-05-07
9	Signal Generator	R&S	SMB100A	175528	2017-01-20
10	PREAMPLIFIER	Agilent	8449B	3008A02011	2016-12-08
11	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW500	114635	2017-03-11