FCC RF TEST REPORT

APPLICANT	:	TP-Link Technologies Co., Ltd.
EQUIPMENT	:	AC1900 Smart Home Router with Touch Screen
BRAND NAME	:	TP-Link
MODEL NAME	:	SR20
MARKETING NAME	:	AC1900 Smart Home Router With Touch Screen
FCC ID	:	TE7SR20
STANDARD	:	47 CFR FCC Part 15 Subpart C § 15.249
CLASSIFICATION	:	(DXX) Low Power Communication Device Transmitter

The product was received on Jan. 28, 2016 and testing was completed on Apr. 21, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR612811A	Rev. 01	Initial issue of report	Nov. 01, 2016

SUMMARY OF THE TEST RESULT

Part	FCC Rule	Description of Test	Result	Under Limit
3.1	15.207	AC Power Line Conducted Emissions	Complies	2.90 dB at 0.638MHz
3.2	2.1049	20dB & 99% Occupied Bandwidth	Complies	-
3.3	15.249(a)	Field Strength of Fundamental Emissions	Complies	0.33 dB at 908.40MHz for Quasi-Peak
3.3	15.249(a)(d)	Radiated Spurious Emissions	Complies	3.68 dB at 226.290MHz
3.4	15.203	Antenna Requirements	Complies	-

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.5**

1. General Description

1.1 Applicant

TP-Link Technologies Co., Ltd.

Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China

1.2 Manufacturer

TP-Link Technologies Co., Ltd.

Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	AC1900 Smart Home Router with Touch Screen
Brand Name	TP-Link
Model Name	SR20
Marketing Name	AC1900 Smart Home Router With Touch Screen
FCC ID	TE7SR20
EUT supports Radios application	900 MHz Z-Wave 2.4 GHz WLAN 11b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40 Zigbee 5 GHz WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Frequency Range	40 kbps: 908.4 MHz 9.6 kbps: 908.42 MHz 100 kbps: 916 MHz
Power Setting	40 kbps: 10 9.6 kbps: 10 100 kbps: 11
Channel Bandwidth (99%)	40 kbps: 84.989 kHz 9.6 kbps: 66.732 kHz 100 kbps: 111.22 kHz
Max. Field Strength (Quasi-Peak)	40 kbps: 93.21 dBμV/m 9.6 kbps: 93.67 dBμV/m 100 kbps: 93.31 dBμV/m
Antenna Type/ Gain	Monopole Antenna type with gain 4.43 dBi
Type of Modulation	40 kbps and 9.6 kbps: 2FSK 100 kbps: 2GFSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Locations

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	CO05-HY
Test Engineer	Kai-Chun Chu
Temperature	23~24 ℃
Relative Humidity	58~59 %

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH10-HY
Test Engineer	Stan Hsieh
Temperature	22~24 ℃
Relative Humidity	44~46 %

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.249
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2. Test Configuration of Equipment Under Test

2.1 Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

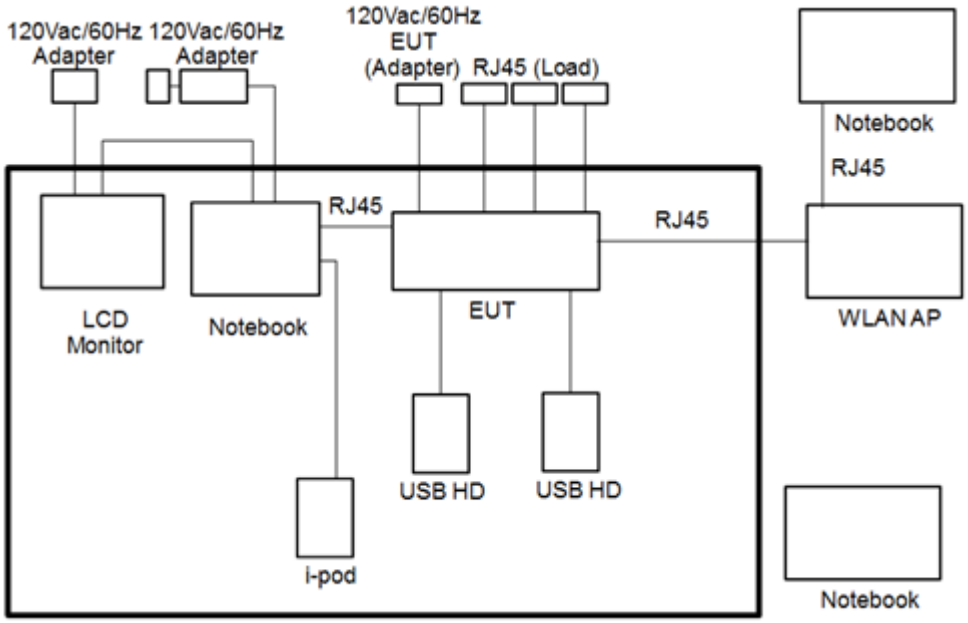
Test Items	Mode
AC Power Line Conducted Emissions	CTX
Field Strength of Fundamental Emissions	CTX
Bandwidth	CTX
Radiated Emissions	CTX

Note:

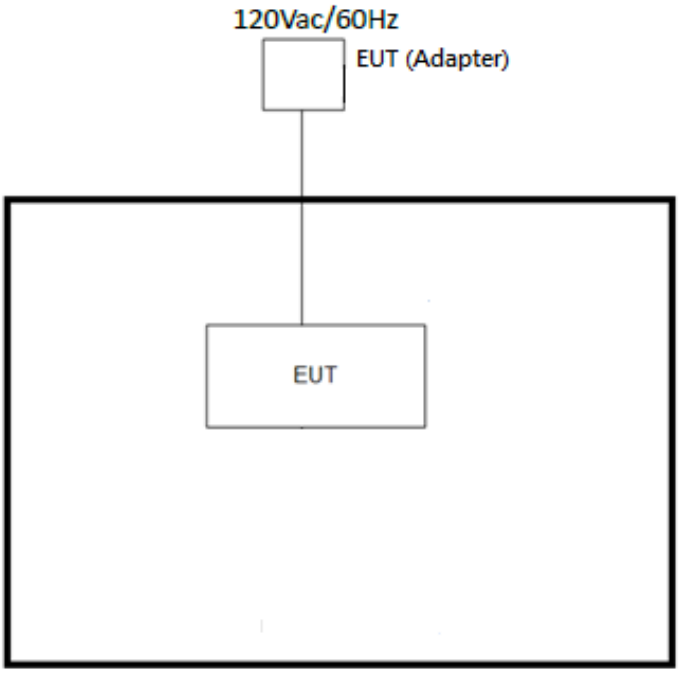
1. CTX=continuously transmitting.
2. The programmed RF utility, “SecureCRT Tool” installed in the notebook to make the EUT get into the engineering modes to continuously transmit

2.2 Connection Diagram of Test System

<AC Conducted Emissions>



<Radiated Spurious Emissions>



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	LCD Monitor	DELL	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
4.	USB HD	WD	WDBAAR3200A BK-PESN	FCC DoC	Unshielded, 0.5 m	N/A
5.	USB HD	PQI	H568V	FCC DoC	Unshielded, 0.5m	N/A
6.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A

3. Test Result

3.1 AC Conducted Emission Measurement

3.1.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	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.

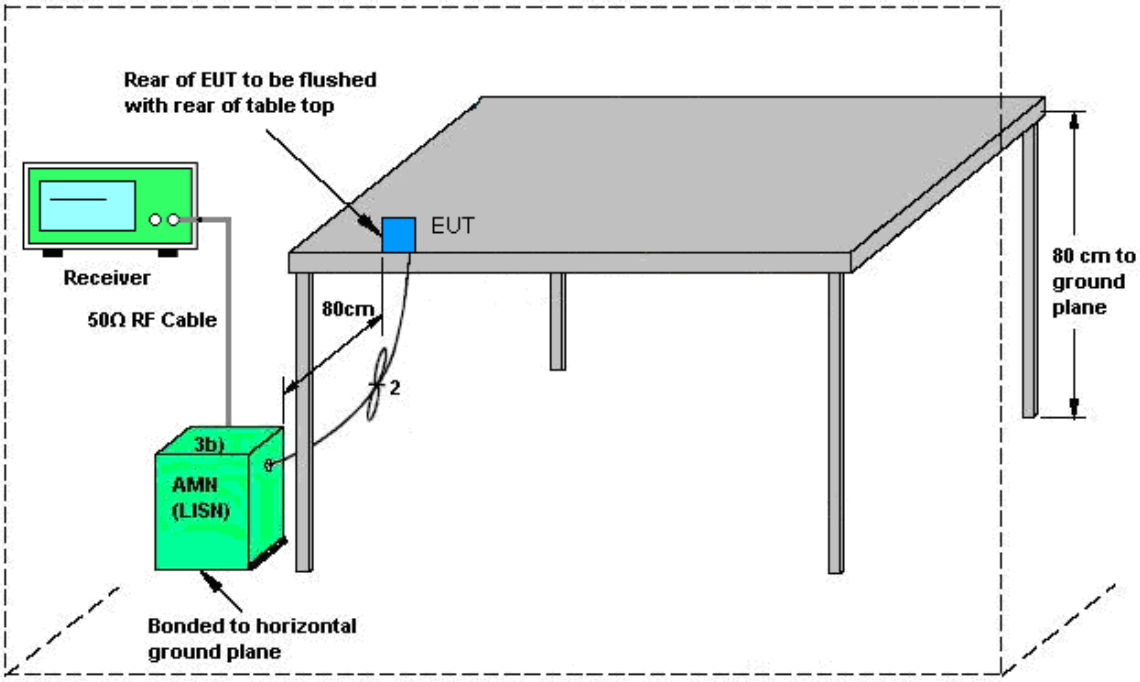
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

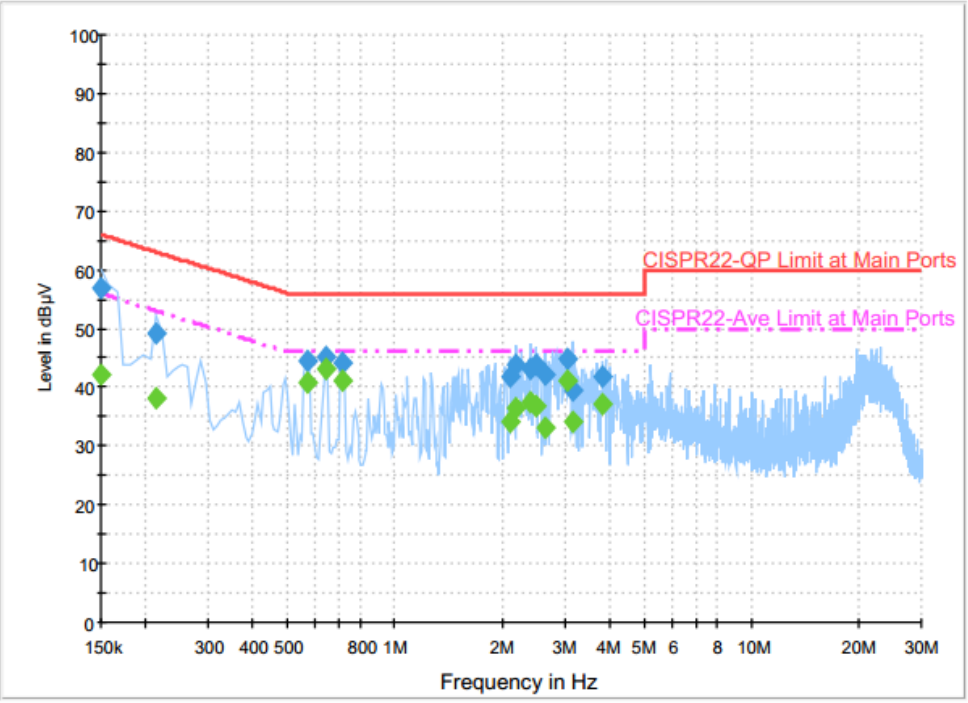
3.1.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.1.5 Test Result of AC Conducted Emission

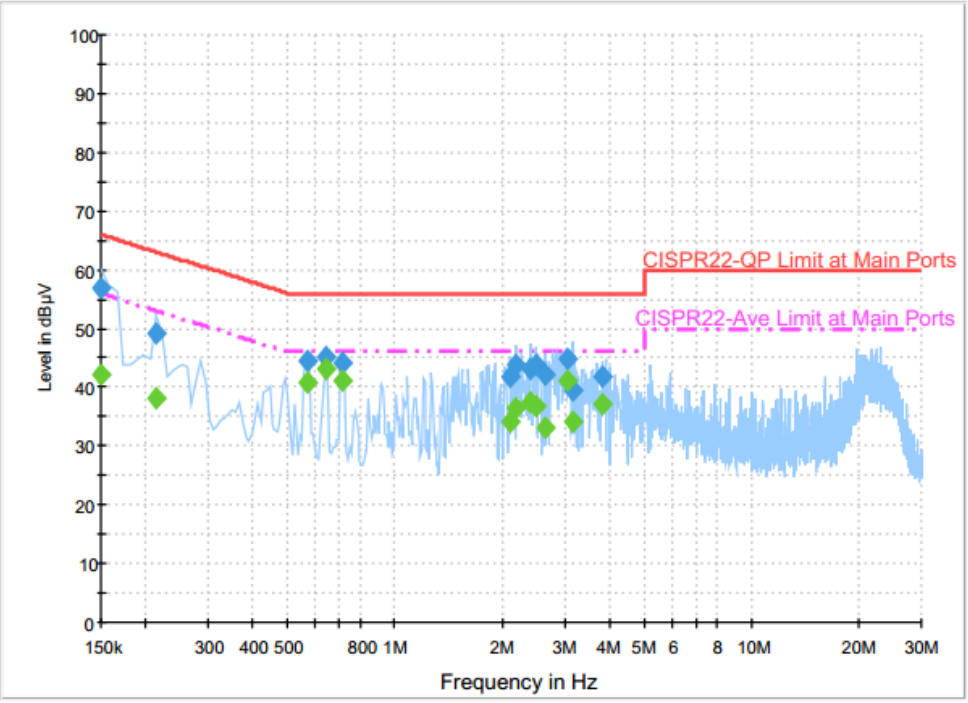
Test Mode :	WLAN (2.4GHz) Link + Zigbee Link + Z-Wave Link + LAN Link + WWAN Link + USB HD + Adapter 1
Phase :	Line



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	56.7	Off	L1	19.6	9.3	66.0
0.214000	49.0	Off	L1	19.6	14.0	63.0
0.566000	44.6	Off	L1	19.6	11.4	56.0
0.638000	45.0	Off	L1	19.6	11.0	56.0
0.710000	44.3	Off	L1	19.6	11.7	56.0
2.118000	41.7	Off	L1	19.5	14.3	56.0
2.182000	43.9	Off	L1	19.5	12.1	56.0
2.398000	43.2	Off	L1	19.6	12.8	56.0
2.486000	43.9	Off	L1	19.6	12.1	56.0
2.646000	42.1	Off	L1	19.6	13.9	56.0
3.038000	44.7	Off	L1	19.6	11.3	56.0
3.158000	39.5	Off	L1	19.6	16.5	56.0
3.830000	41.9	Off	L1	19.7	14.1	56.0

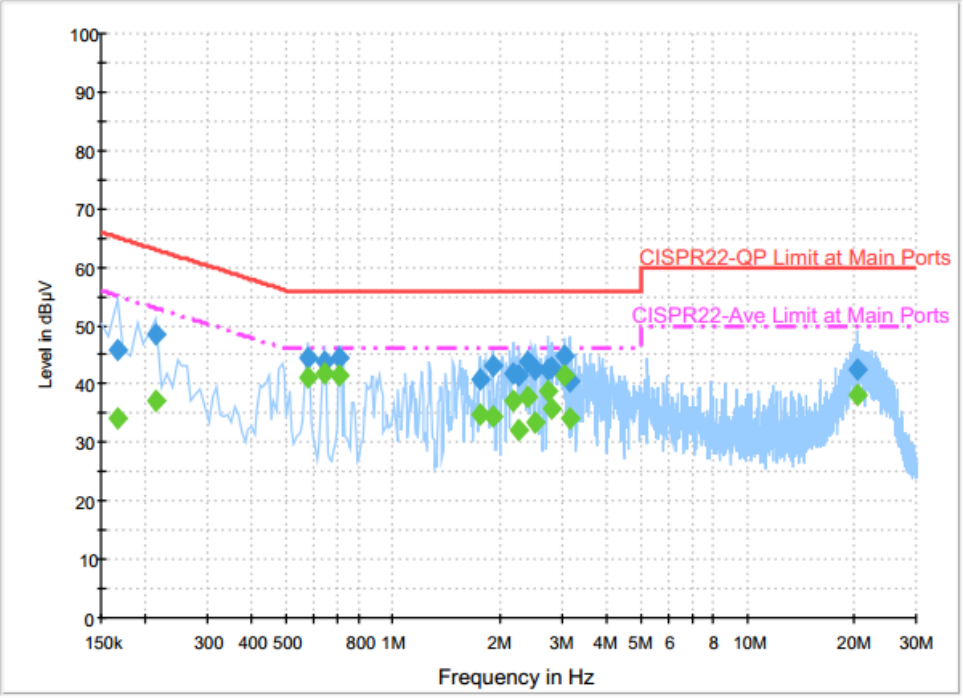
Phase :	Line



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	42.0	Off	L1	19.6	14.0	56.0
0.214000	38.2	Off	L1	19.6	14.8	53.0
0.566000	40.7	Off	L1	19.6	5.3	46.0
0.638000	43.1	Off	L1	19.6	2.9	46.0
0.710000	41.1	Off	L1	19.6	4.9	46.0
2.118000	34.2	Off	L1	19.5	11.8	46.0
2.182000	36.5	Off	L1	19.5	9.5	46.0
2.398000	37.5	Off	L1	19.6	8.5	46.0
2.486000	36.7	Off	L1	19.6	9.3	46.0
2.646000	33.0	Off	L1	19.6	13.0	46.0
3.038000	41.2	Off	L1	19.6	4.8	46.0
3.158000	34.0	Off	L1	19.6	12.0	46.0
3.830000	37.0	Off	L1	19.7	9.0	46.0

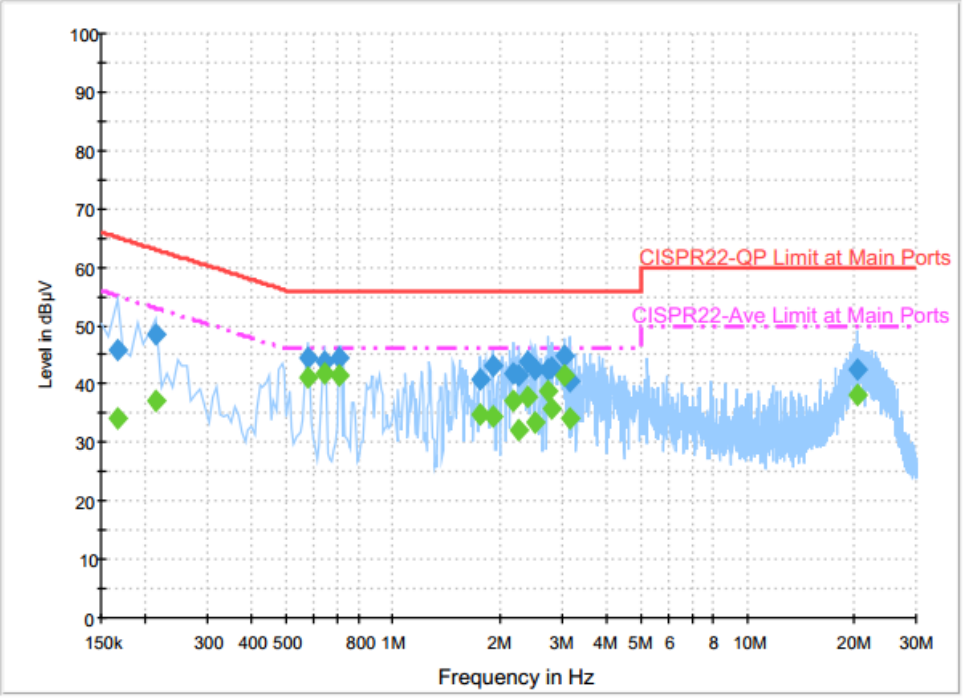
Phase :	Neutral



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	45.7	Off	N	19.6	19.5	65.2
0.214000	48.6	Off	N	19.6	14.4	63.0
0.574000	44.6	Off	N	19.6	11.4	56.0
0.638000	43.9	Off	N	19.6	12.1	56.0
0.702000	44.5	Off	N	19.6	11.5	56.0
1.758000	40.8	Off	N	19.6	15.2	56.0
1.918000	43.2	Off	N	19.6	12.8	56.0
2.182000	41.8	Off	N	19.5	14.2	56.0
2.278000	41.3	Off	N	19.6	14.7	56.0
2.398000	43.9	Off	N	19.6	12.1	56.0
2.534000	42.6	Off	N	19.6	13.4	56.0
2.734000	42.5	Off	N	19.6	13.5	56.0
2.822000	42.8	Off	N	19.6	13.2	56.0
3.038000	44.7	Off	N	19.6	11.3	56.0
3.158000	40.6	Off	N	19.6	15.4	56.0
20.382000	42.5	Off	N	19.9	17.5	60.0

Phase :	Neutral



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	34.0	Off	N	19.6	21.2	55.2
0.214000	37.2	Off	N	19.6	15.8	53.0
0.574000	41.2	Off	N	19.6	4.8	46.0
0.638000	41.8	Off	N	19.6	4.2	46.0
0.702000	41.3	Off	N	19.6	4.7	46.0
1.758000	34.7	Off	N	19.6	11.3	46.0
1.918000	34.3	Off	N	19.6	11.7	46.0
2.182000	37.1	Off	N	19.5	8.9	46.0
2.278000	32.2	Off	N	19.6	13.8	46.0
2.398000	37.6	Off	N	19.6	8.4	46.0
2.534000	33.6	Off	N	19.6	12.4	46.0
2.734000	38.9	Off	N	19.6	7.1	46.0
2.822000	35.6	Off	N	19.6	10.4	46.0
3.038000	41.5	Off	N	19.6	4.5	46.0
3.158000	34.2	Off	N	19.6	11.8	46.0
20.382000	38.2	Off	N	19.9	11.8	50.0

3.2 20dB and 99% Occupied Bandwidth

3.2.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

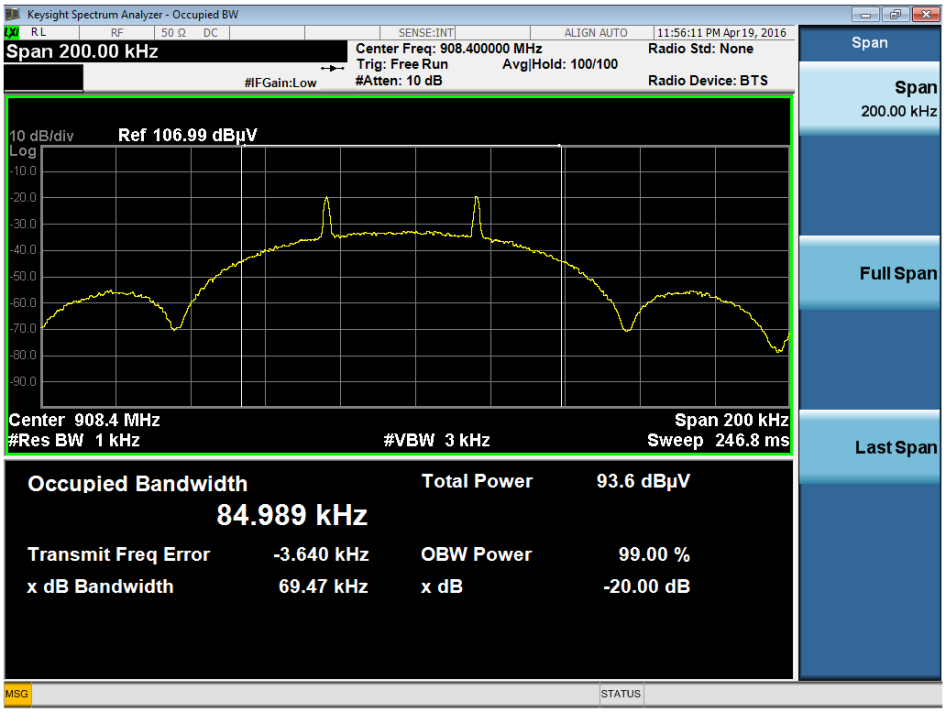
3.2.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna.
2. The RBW is set to 1% to 5% of the 99% OBW, the VBW is set to 3 times the RBW.
3. Measured the spectrum width with power higher than 20dB below carrier.
4. Measure the 99% OBW.

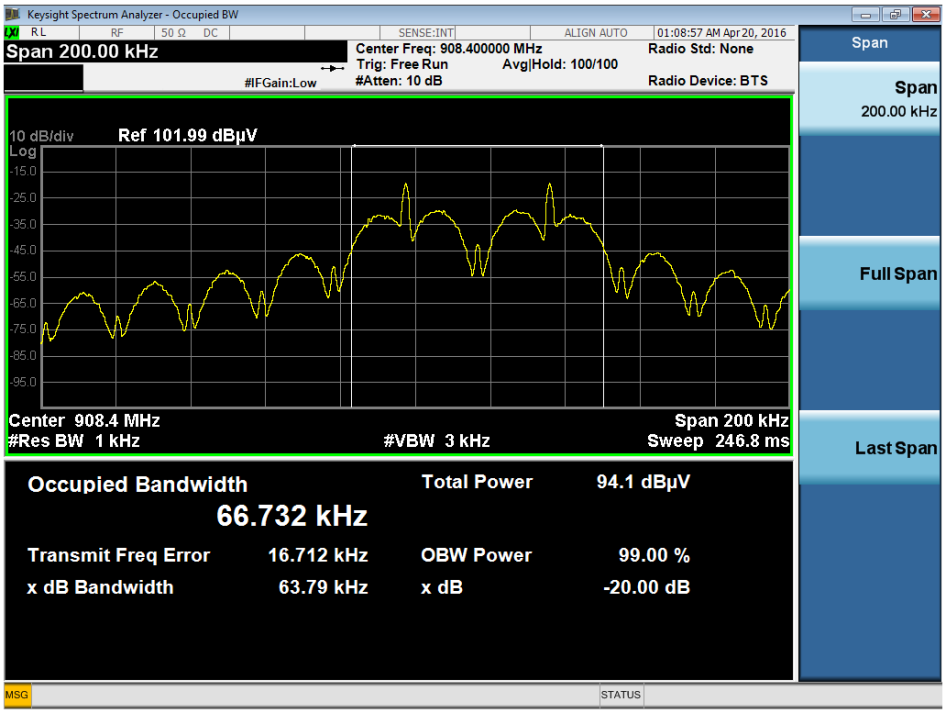
3.2.4 Test Result of 20dB Spectrum Bandwidth

Mode	20dB BW (kHz)	99% OBW (kHz)
40 kbps	69.47	84.989
9.6 kbps	63.79	66.732
100 kbps	124.2	111.22

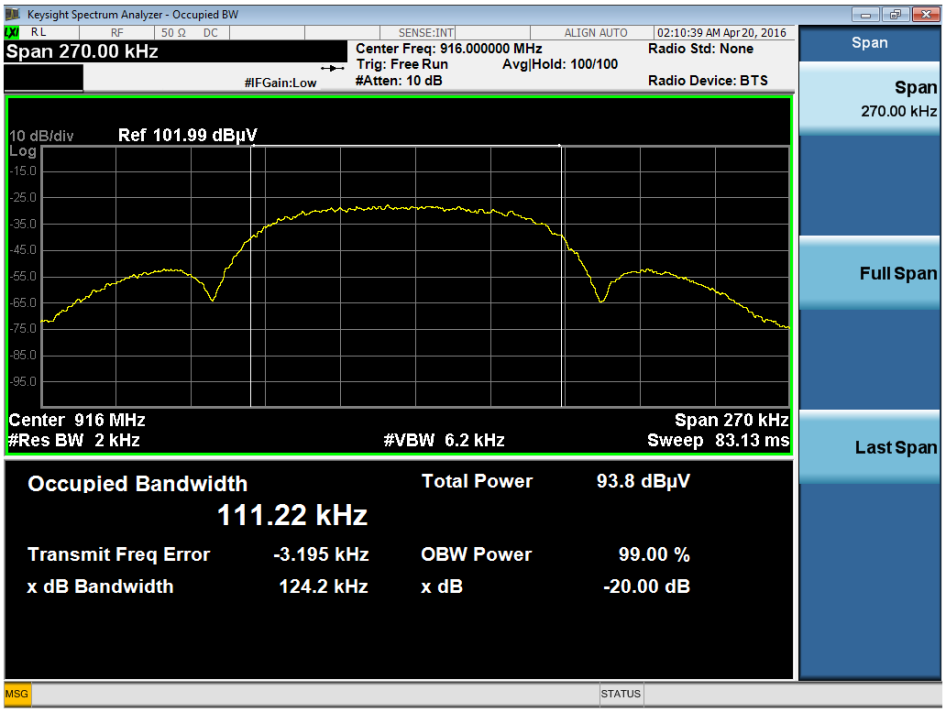
20 dB and 99% Occupied Bandwidth Plot on 40 kbps



20 dB and 99% Occupied Bandwidth Plot on 9.6 kbps



20 dB and 99% Occupied Bandwidth Plot on 100 kbps



3.3 Field Strength of Fundamental Emissions and Radiated Spurious Emissions

3.3.1 Limit

The field strength measured at 3 meters shall not exceed the limits in the following table:

Fundamental Frequencies(MHz)	Field Strength(millivolts/m)	
	Fundamental	Harmonics
902~928	50	0.5
2400~2483.5	50	0.5
5725~5875	50	0.5

Note: The limits shown in the above table are based on measurements using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using a CISPR quasi-peak detector.

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed in 15.209 as below, whichever is less stringent.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.3.2 Measuring Instruments

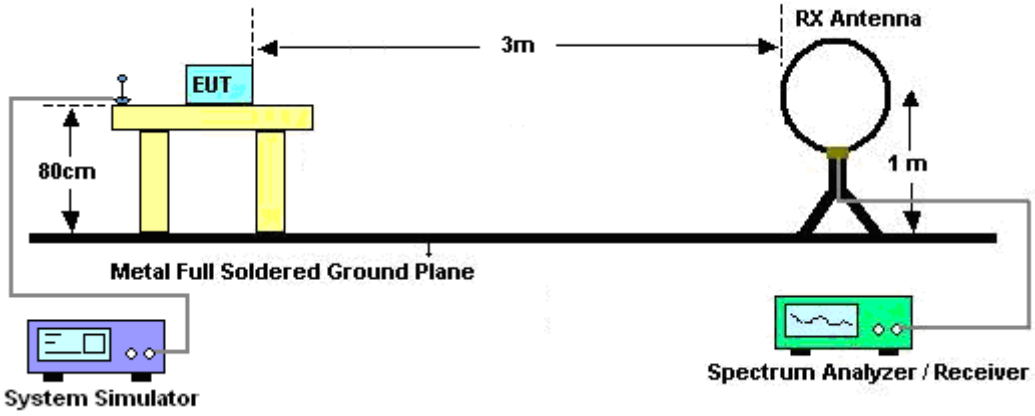
The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

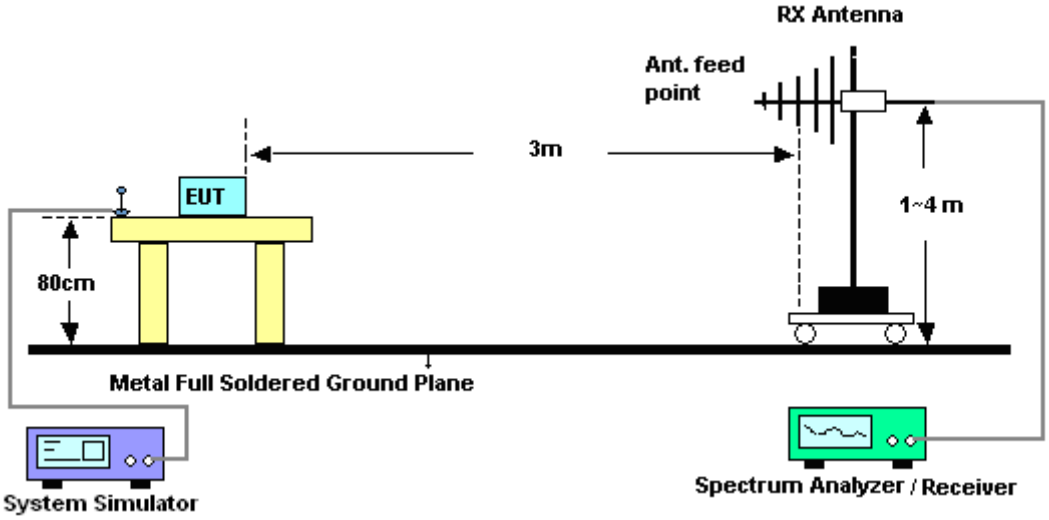
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
   Span shall wide enough to fully capture the emission being measured;
   Set RBW=120 kHz for f < 1 GHz, RBW=1MHz for f>1GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.3.4 Test Setup

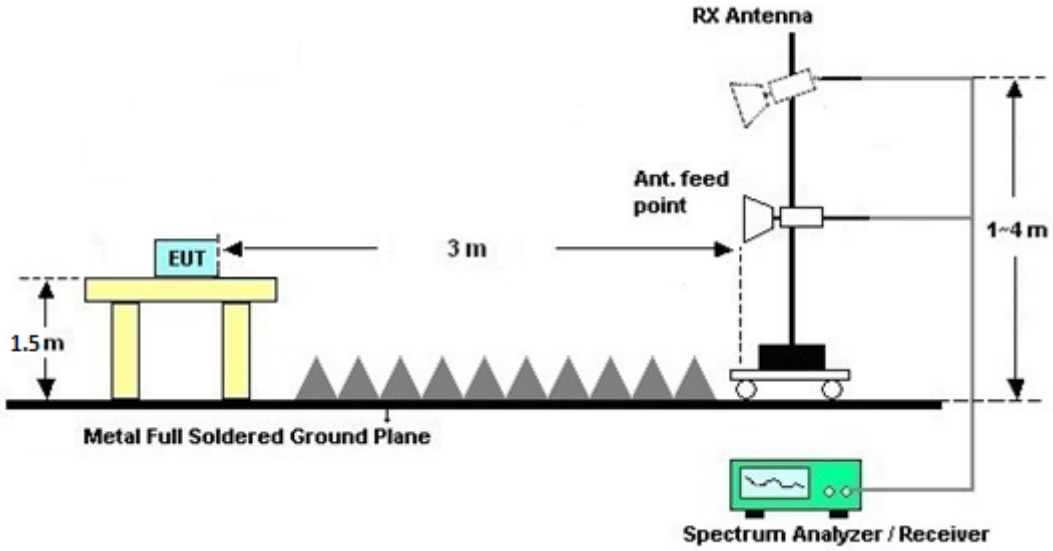
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

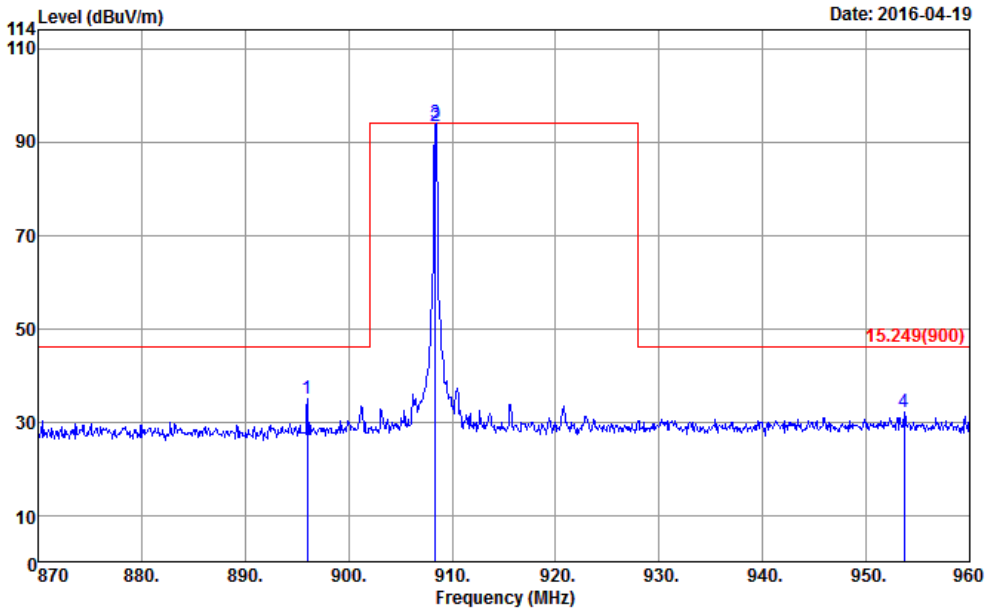


3.3.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

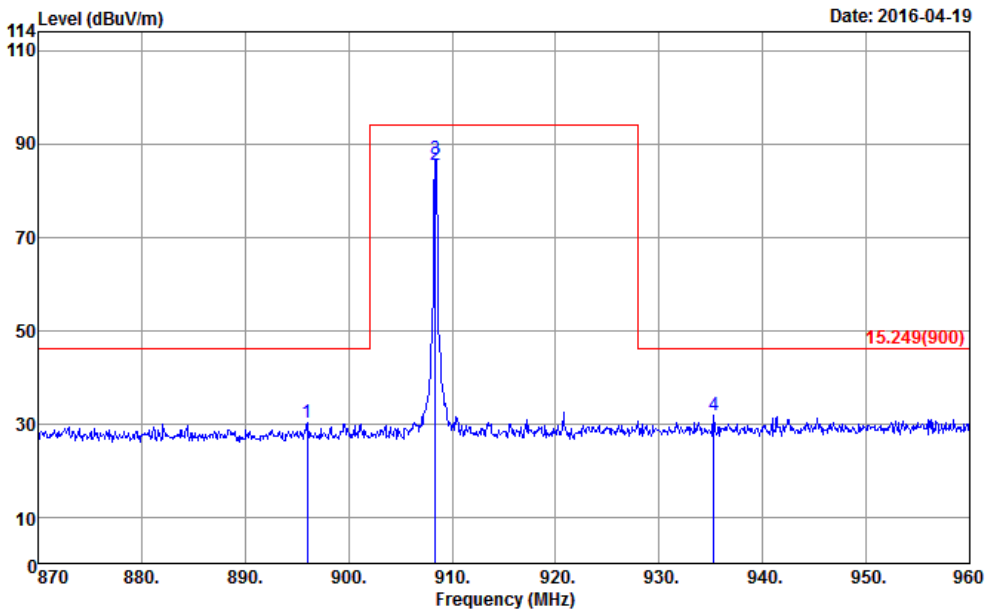
3.3.6 Test Result of Field Strength of Fundamental Emissions

40 kbps



Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF HORIZONTAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto
Detector : Peak

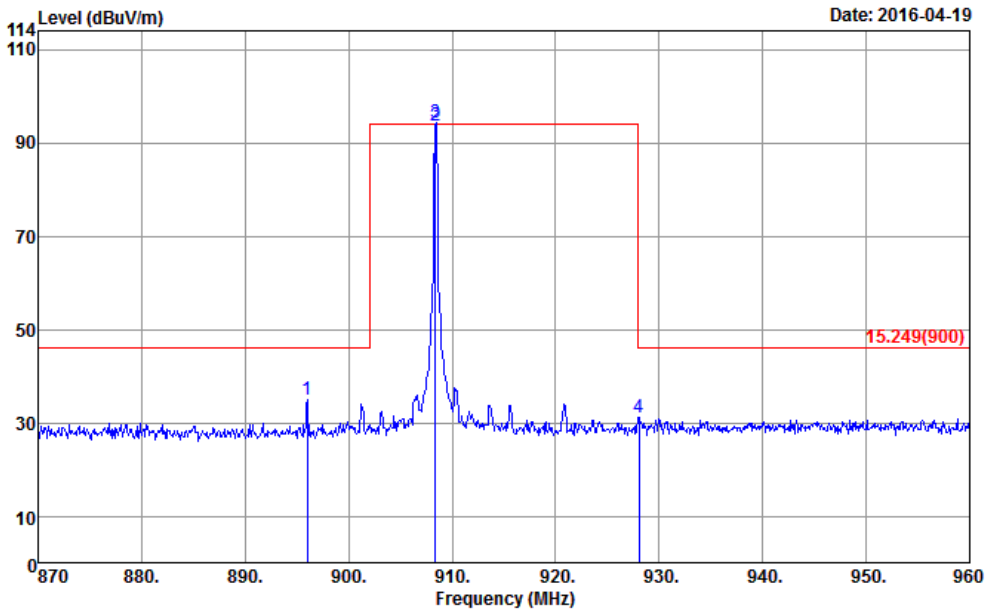
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	896.01	34.92	-11.08	46.00	35.35	28.70	3.20	32.33	100	115	Peak
2	908.40	93.21	-0.79	94.00	93.30	28.93	3.20	32.22	100	115	QP
3	908.40	93.86			93.95	28.93	3.20	32.22	100	115	Peak
4	953.70	31.93	-14.07	46.00	30.36	30.00	3.29	31.72	100	115	Peak



Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF VERTICAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto
Detector : Peak

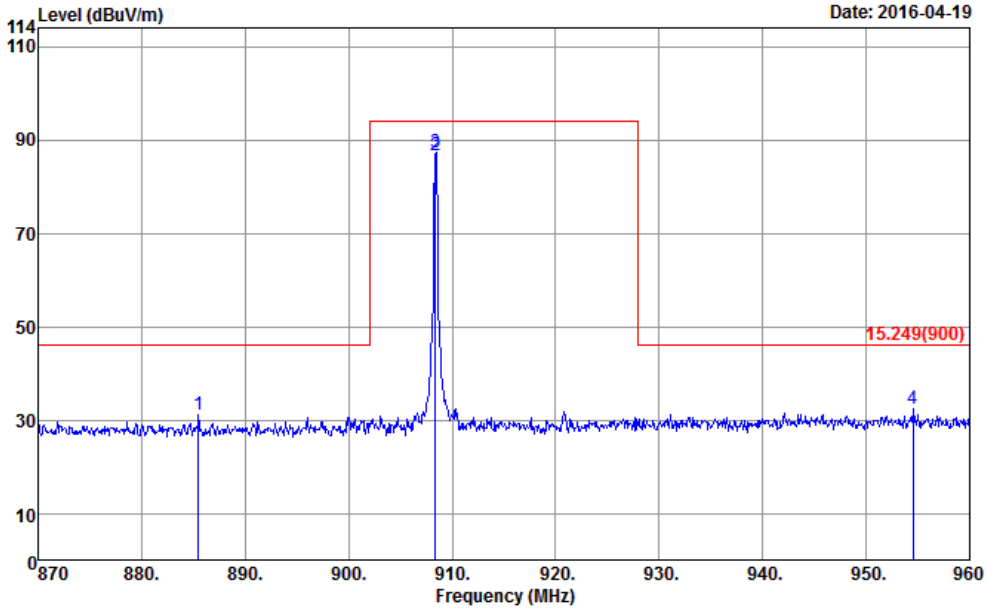
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	896.01	30.11	-15.89	46.00	30.54	28.70	3.20	32.33	168	80	Peak
2	908.40	85.56	-8.44	94.00	85.65	28.93	3.20	32.22	168	80	QP
3	908.40	86.84			86.93	28.93	3.20	32.22	168	80	Peak
4	935.25	31.84	-14.16	46.00	30.86	29.62	3.29	31.93	168	80	Peak

9.6 kbps



Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF HORIZONTAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto
Detector : Peak

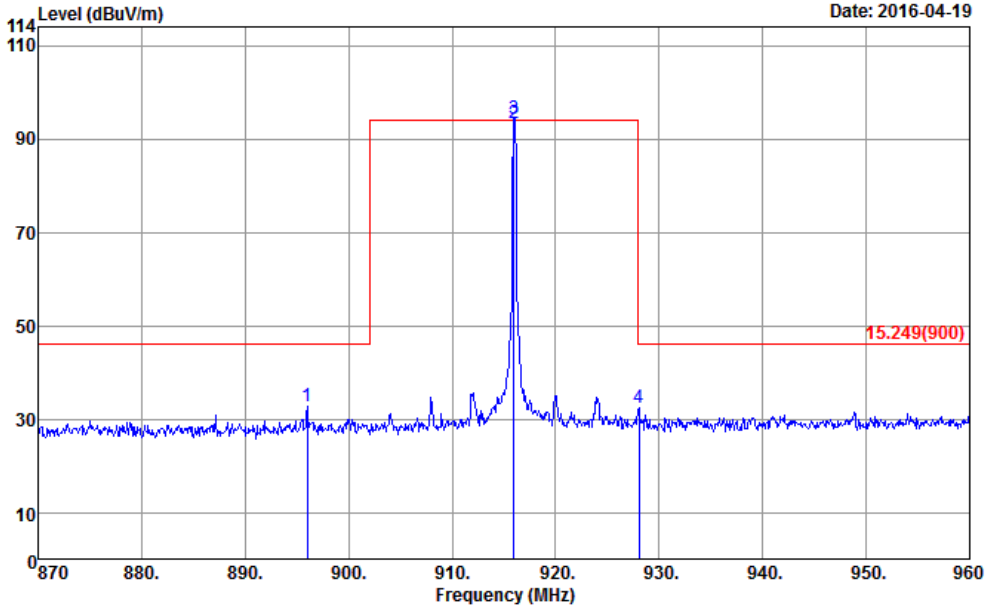
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	896.01	34.84	-11.16	46.00	35.27	28.70	3.20	32.33	100	119	Peak
2	908.40	93.67	-0.33	94.00	93.76	28.93	3.20	32.22	100	119	QP
3 *	908.40	94.41			94.50	28.93	3.20	32.22	100	119	Peak
4	928.05	31.15	-14.85	46.00	30.42	29.44	3.29	32.00	100	119	Peak



Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF VERTICAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto
Detector : Peak

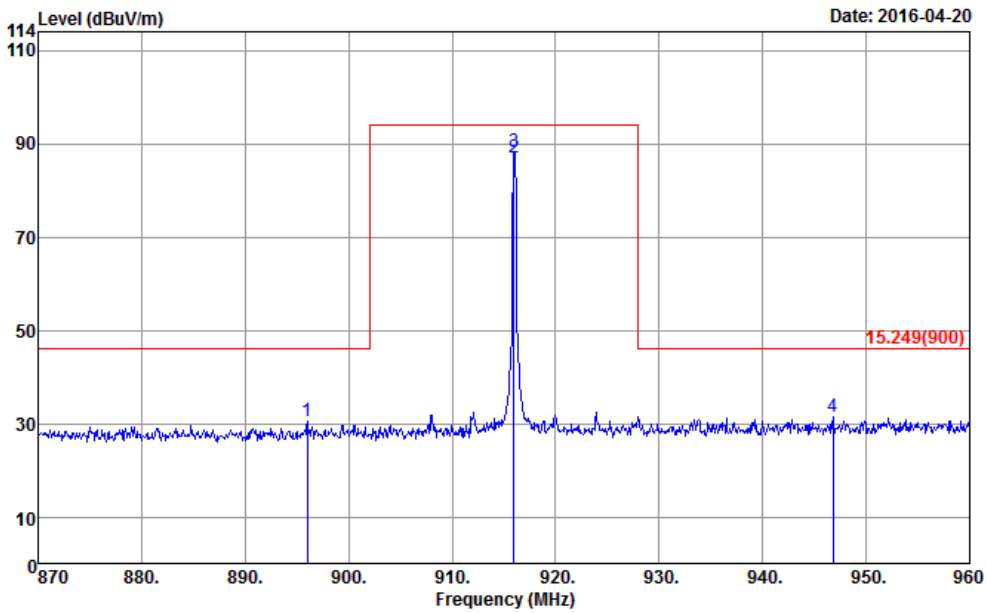
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	885.48	31.03	-14.97	46.00	31.53	28.70	3.20	32.40	166	103	Peak
2	908.40	86.56	-7.44	94.00	86.65	28.93	3.20	32.22	166	103	QP
3	908.40	87.32			87.41	28.93	3.20	32.22	166	103	Peak
4	954.51	32.50	-13.50	46.00	30.91	30.00	3.29	31.70	166	103	Peak

100 kbps



Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF HORIZONTAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto
Detector : Peak

		Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1		896.01	32.68	-13.32	46.00	33.11	28.70	3.20	32.33	166	120	Peak
2		916.00	93.31	-0.69	94.00	93.13	29.11	3.20	32.13	166	120	QP
3	*	916.00	94.47			94.29	29.11	3.20	32.13	166	120	Peak
4		928.05	32.39	-13.61	46.00	31.66	29.44	3.29	32.00	166	120	Peak

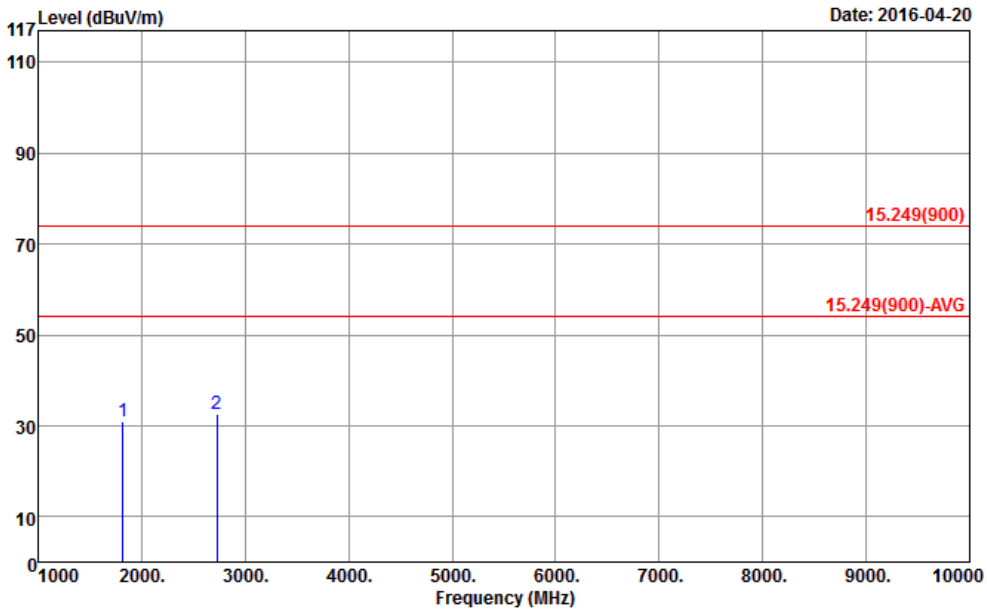


Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF VERTICAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	896.01	30.57	-15.43	46.00	31.00	28.70	3.20	32.33	164	100	Peak
2	916.00	87.13	-6.87	94.00	86.95	29.11	3.20	32.13	164	100	QP
3	916.00	88.20			88.02	29.11	3.20	32.13	164	100	Peak
4	946.77	31.31	-14.69	46.00	29.89	29.92	3.29	31.79	164	100	Peak

3.3.7 Test Result of Radiated Spurious Emissions (1 GHz~10GHz)

40 kbps

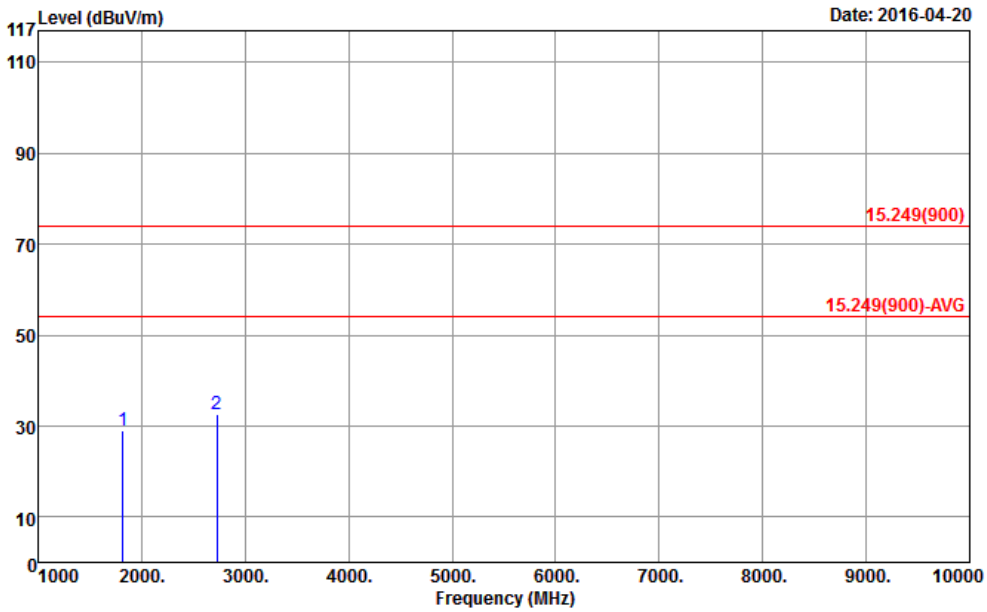


Site : 03CH10-HY
Condition : 15.249(900) 3m HORN 9120D-HF HORIZONTAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1817.00	30.97	-43.03	74.00	61.94	25.91	4.66	61.54	100	0	Peak
2	2725.00	32.67	-41.33	74.00	59.96	27.93	5.74	60.96	100	0	Peak

Remark:

1. Average measurement was not performed if peak level went lower than the average limit.
2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31.



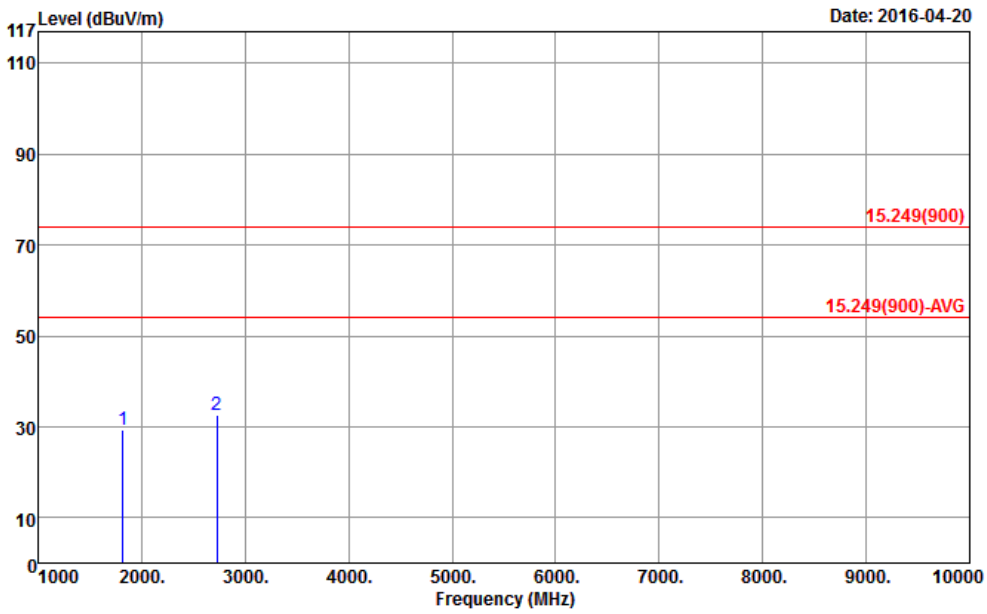
Site : 03CH10-HY
Condition : 15.249(900) 3m HORN 9120D-HF VERTICAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1817.00	29.00	-45.00	74.00	59.97	25.91	4.66	61.54	100	0	Peak
2	2725.00	32.45	-41.55	74.00	59.74	27.93	5.74	60.96	100	0	Peak

Remark:

1. Average measurement was not performed if peak level went lower than the average limit.
2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31.

9.6 kbps

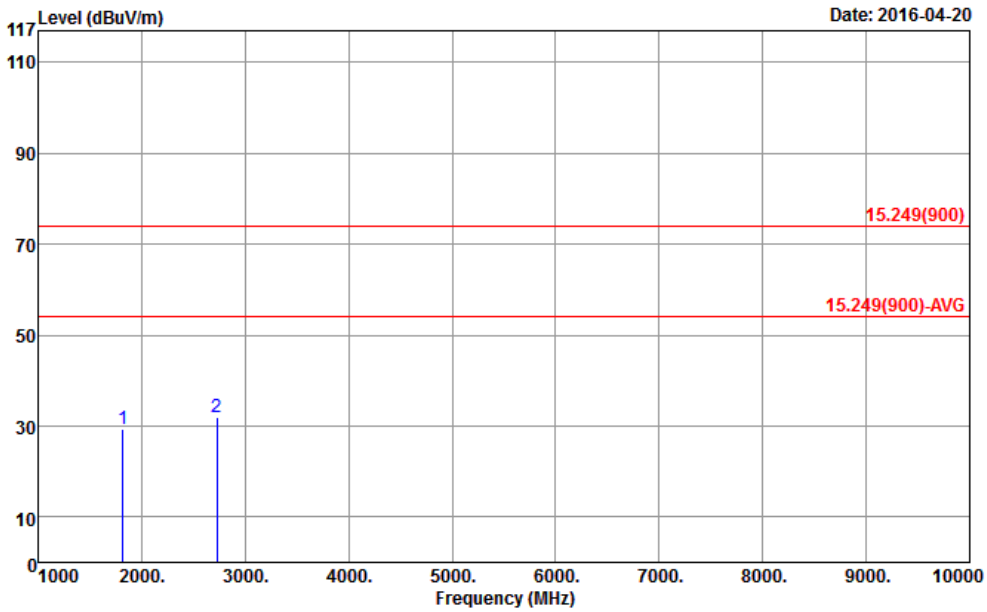


Site : 03CH10-HY
Condition : 15.249(900) 3m HORN 9120D-HF HORIZONTAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1817.00	29.20	-44.80	74.00	60.17	25.91	4.66	61.54	100	0	Peak
2	2725.00	32.63	-41.37	74.00	59.92	27.93	5.74	60.96	100	0	Peak

Remark:

1. Average measurement was not performed if peak level went lower than the average limit.
2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31.



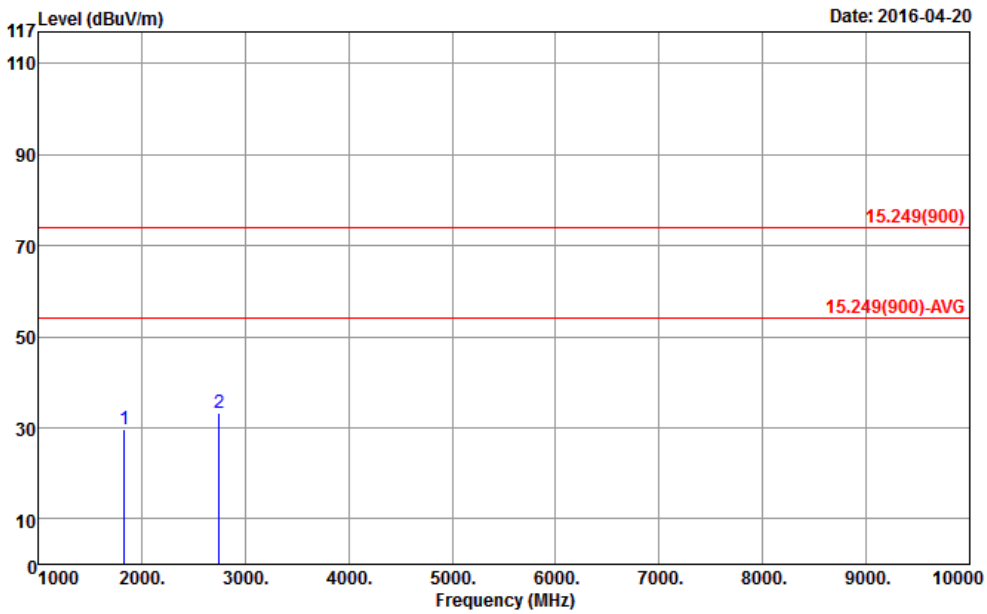
Site : 03CH10-HY
Condition : 15.249(900) 3m HORN 9120D-HF VERTICAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1817.00	29.34	-44.66	74.00	60.31	25.91	4.66	61.54	100	0	Peak
2	2725.00	32.02	-41.98	74.00	59.31	27.93	5.74	60.96	100	0	Peak

Remark:

1. Average measurement was not performed if peak level went lower than the average limit.
2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31.

100 kbps

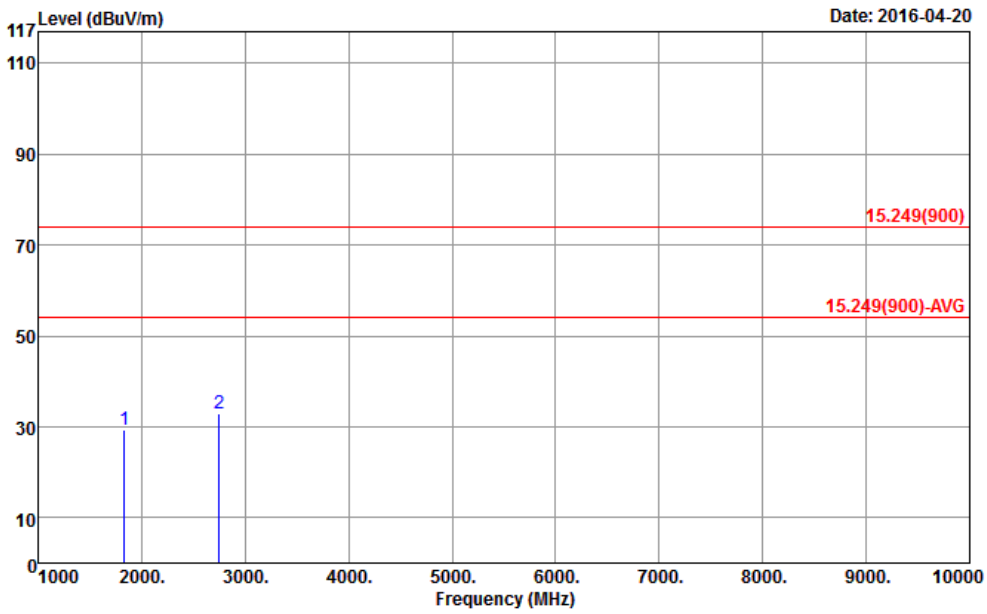


Site : 03CH10-HY
Condition : 15.249(900) 3m HORN 9120D-HF HORIZONTAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1832.00	29.63	-44.37	74.00	60.57	25.93	4.66	61.53	100	0	Peak
2	2748.00	33.14	-40.86	74.00	60.35	28.00	5.74	60.95	100	0	Peak

Remark:

1. Average measurement was not performed if peak level went lower than the average limit.
2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31.



Site : 03CH10-HY
Condition : 15.249(900) 3m HORN 9120D-HF VERTICAL
Detector : Peak

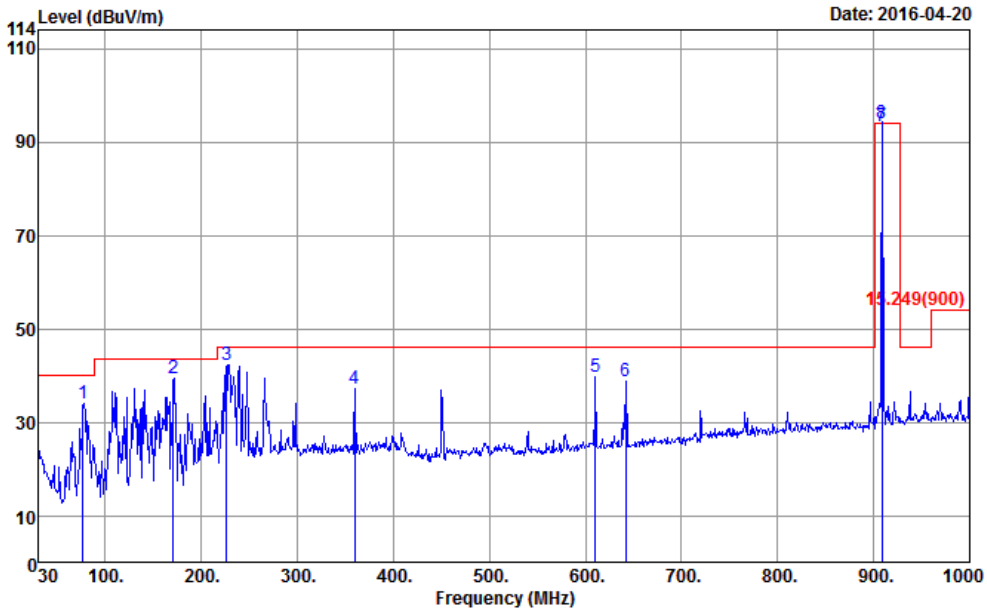
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	1832.00	29.41	-44.59	74.00	60.35	25.93	4.66	61.53	100	0	Peak
2	2748.00	32.95	-41.05	74.00	60.16	28.00	5.74	60.95	100	0	Peak

Remark:

1. Average measurement was not performed if peak level went lower than the average limit.
2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31.

3.3.8 Test Result of Radiated Spurious Emissions (30 MHz~1GHz)

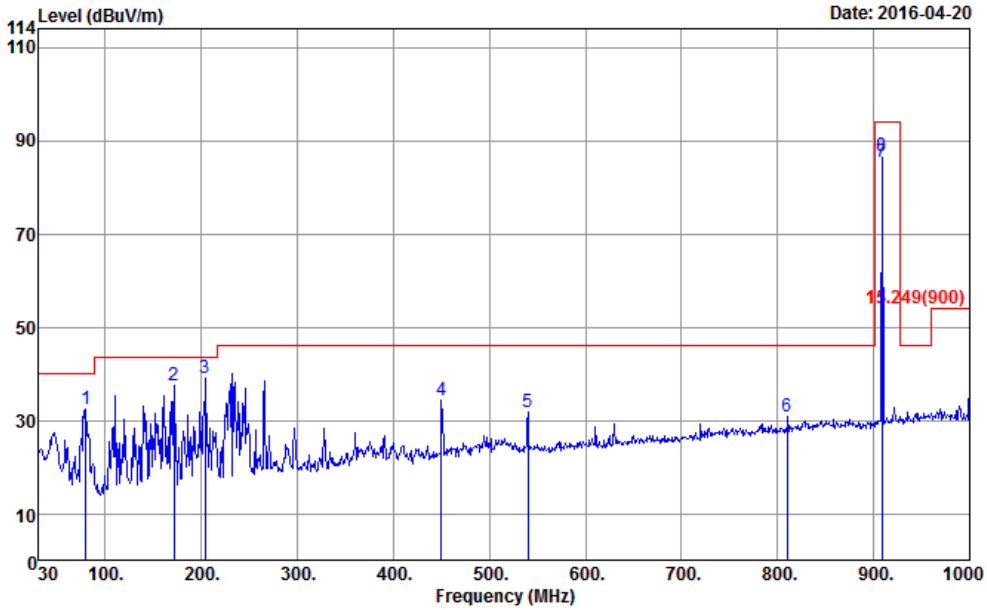
40 kbps



Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF HORIZONTAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	76.98	33.89	-6.11	40.00	52.23	13.43	0.93	32.70	---	---	Peak
2	170.94	39.45	-4.05	43.50	54.53	16.14	1.48	32.70	---	---	Peak
3	226.29	42.32	-3.68	46.00	56.75	16.68	1.62	32.73	100	5	Peak
4	359.50	37.10	-8.90	46.00	46.52	21.44	1.94	32.80	---	---	Peak
5	610.10	39.57	-6.43	46.00	44.38	25.60	2.62	33.03	---	---	Peak
6	641.60	38.71	-7.29	46.00	43.18	25.92	2.62	33.01	---	---	Peak
7	908.40	93.21			93.30	28.93	3.20	32.22	100	115	QP
8	908.40	93.86			93.95	28.93	3.20	32.22	100	115	Peak

Note: 908.40 MHz is fundamental signal which can be ignored.

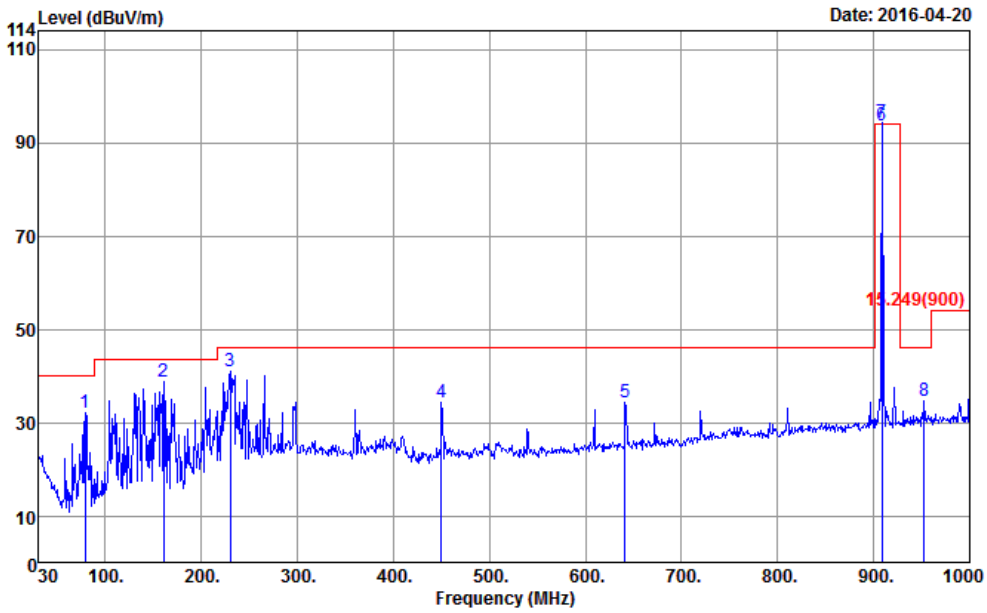


Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF VERTICAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	79.41	32.32	-7.68	40.00	50.30	13.78	0.93	32.69	---	---	Peak
2	171.48	37.60	-5.90	43.50	52.75	16.07	1.48	32.70	---	---	Peak
3	203.88	39.17	-4.33	43.50	54.31	16.11	1.48	32.73	104	33	Peak
4	449.80	34.34	-11.66	46.00	41.72	23.20	2.30	32.88	---	---	Peak
5	540.10	31.65	-14.35	46.00	37.70	24.44	2.47	32.96	---	---	Peak
6	810.30	30.94	-15.06	46.00	32.63	28.06	3.07	32.82	---	---	Peak
7	908.40	85.56			85.65	28.93	3.20	32.22	168	80	QP
8	908.40	86.84			86.93	28.93	3.20	32.22	168	80	Peak

Note: 908.40 MHz is fundamental signal which can be ignored.

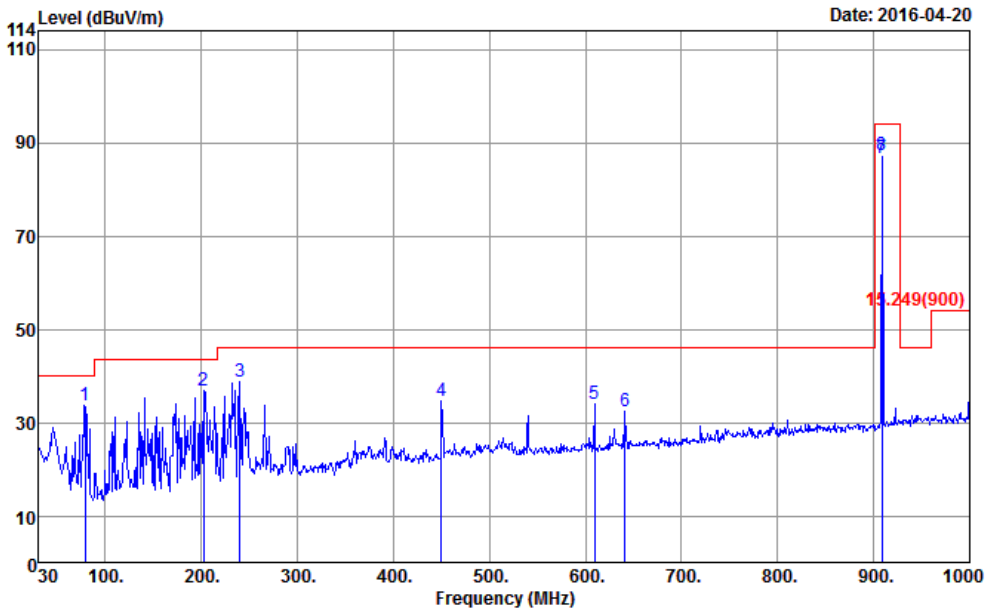
9.6 kbps



Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF HORIZONTAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	79.14	32.00	-8.00	40.00	49.98	13.78	0.93	32.69	---	---	Peak
2	160.41	38.76	-4.74	43.50	53.12	17.00	1.33	32.69	100	66	Peak
3	230.07	40.97	-5.03	46.00	55.08	17.00	1.62	32.73	---	---	Peak
4	449.80	34.37	-11.63	46.00	41.75	23.20	2.30	32.88	---	---	Peak
5	640.90	34.34	-11.66	46.00	38.82	25.91	2.62	33.01	---	---	Peak
6	908.40	93.67			93.76	28.93	3.20	32.22	100	119	QP
7 *	908.40	94.41			94.50	28.93	3.20	32.22	100	119	Peak
8	952.40	34.70	-11.30	46.00	33.15	30.00	3.29	31.74	---	---	Peak

Note: 908.40 MHz is fundamental signal which can be ignored.

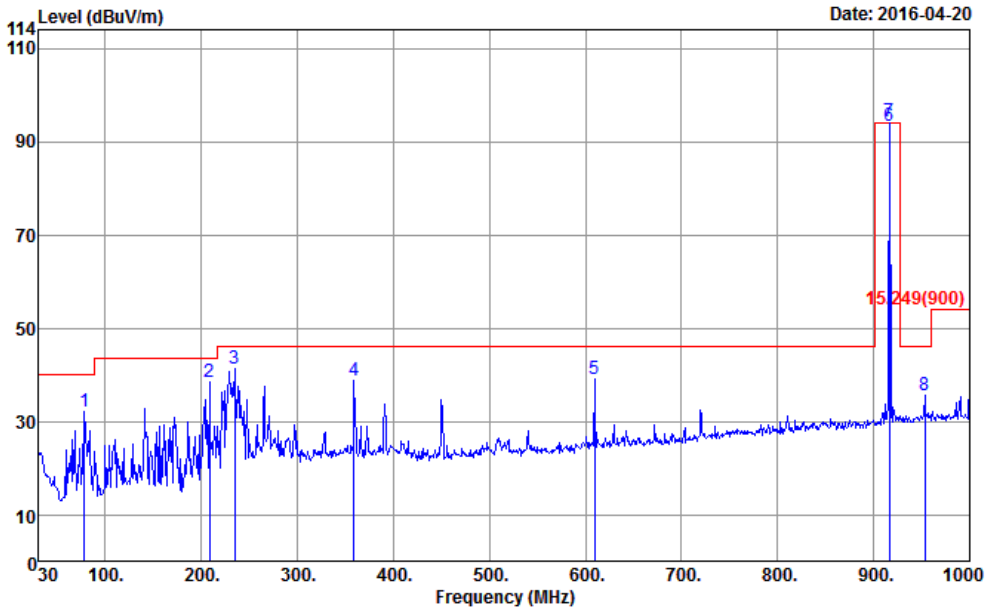


Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF VERTICAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	78.60	33.81	-6.19	40.00	51.91	13.66	0.93	32.69	100	2	Peak
2	202.26	36.69	-6.81	43.50	51.86	16.08	1.48	32.73	---	---	Peak
3	240.33	38.69	-7.31	46.00	51.82	17.98	1.62	32.73	---	---	Peak
4	449.80	34.67	-11.33	46.00	42.05	23.20	2.30	32.88	---	---	Peak
5	609.40	34.12	-11.88	46.00	38.94	25.59	2.62	33.03	---	---	Peak
6	640.90	32.24	-13.76	46.00	36.72	25.91	2.62	33.01	---	---	Peak
7	908.40	86.56			86.65	28.93	3.20	32.22	166	103	QP
8	908.40	87.32			87.41	28.93	3.20	32.22	166	103	Peak

Note: 908.40 MHz is fundamental signal which can be ignored.

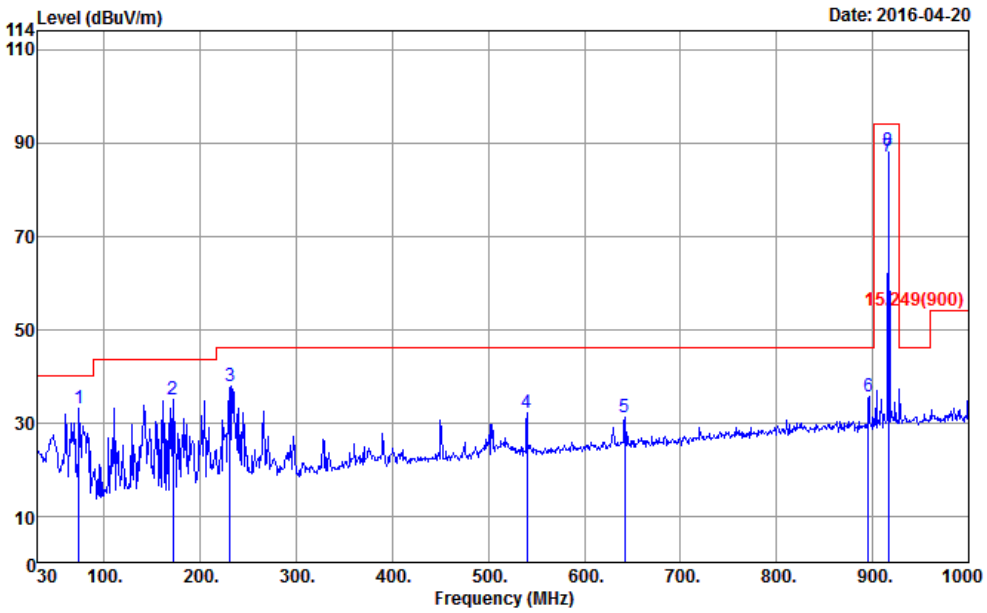
100 kbps



Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF HORIZONTAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	78.33	32.00	-8.00	40.00	50.11	13.66	0.93	32.70	---	---	Peak
2	208.47	38.45	-5.05	43.50	53.31	16.25	1.62	32.73	---	---	Peak
3	234.66	41.29	-4.71	46.00	54.95	17.45	1.62	32.73	100	0	Peak
4	358.80	38.64	-7.36	46.00	48.09	21.41	1.94	32.80	---	---	Peak
5	609.40	38.98	-7.02	46.00	43.80	25.59	2.62	33.03	---	---	Peak
6	916.00	93.31			93.13	29.11	3.20	32.13	166	120	QP
7 *	916.00	94.47			94.29	29.11	3.20	32.13	166	120	Peak
8	953.10	35.56	-10.44	46.00	34.00	30.00	3.29	31.73	---	---	Peak

Note: 916.00 MHz is fundamental signal which can be ignored.



Site : 03CH10-HY
Condition : 15.249(900) 3m BI-LOG 6111D-LF VERTICAL
Detector : Peak

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	73.20	33.17	-6.83	40.00	51.88	13.07	0.93	32.71	100	23	Peak
2	171.75	35.01	-8.49	43.50	50.16	16.07	1.48	32.70	---	---	Peak
3	231.15	37.81	-8.19	46.00	51.83	17.09	1.62	32.73	---	---	Peak
4	540.10	32.11	-13.89	46.00	38.16	24.44	2.47	32.96	---	---	Peak
5	641.60	30.99	-15.01	46.00	35.46	25.92	2.62	33.01	---	---	Peak
6	895.70	35.46	-10.54	46.00	35.89	28.70	3.20	32.33	---	---	Peak
7	916.00	87.13			86.95	29.11	3.20	32.13	164	100	QP
8	916.00	88.20			88.02	29.11	3.20	32.13	164	100	Peak

Note: 916.00 MHz is fundamental signal which can be ignored.

3.4 Antenna Requirements

3.4.1 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.4.2 Antenna Connector Construction

Enbedded in Antenna.

4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Apr. 19, 2016 ~ Apr. 20, 2016	Sep. 01, 2016	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D	35413	30MHz~1GHz	Jan. 13, 2016	Apr. 19, 2016 ~ Apr. 20, 2016	Jan. 12, 2017	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz ~ 18GHz	Sep. 30, 2015	Apr. 19, 2016 ~ Apr. 20, 2016	Sep. 29, 2016	Radiation (03CH10-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Nov. 16, 2015	Apr. 19, 2016 ~ Apr. 20, 2016	Nov. 15, 2016	Radiation (03CH10-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1902246	1GHz~18GHz	Nov. 16, 2015	Apr. 19, 2016 ~ Apr. 20, 2016	Nov. 15, 2016	Radiation (03CH10-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY55420170	N/A	Mar. 10, 2016	Apr. 19, 2016 ~ Apr. 20, 2016	Mar. 09, 2017	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz ~ 44GHz	Oct. 15, 2015	Apr. 19, 2016 ~ Apr. 20, 2016	Oct. 14, 2016	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Apr. 19, 2016 ~ Apr. 20, 2016	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Apr. 19, 2016 ~ Apr. 20, 2016	N/A	Radiation (03CH10-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Apr. 21, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 26, 2015	Apr. 21, 2016	Aug. 25, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	Apr. 21, 2016	Dec. 01, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 14, 2015	Apr. 21, 2016	Dec. 13, 2016	Conduction (CO05-HY)