FCC RF Test Report

APPLICANT	:	Ness Corporation
EQUIPMENT	:	Hub
BRAND NAME	:	Mezzo
MODEL NAME	:	Mezzo-915
FCC ID	:	O2K-MEZZO915LTE
CLASSIFICATION	:	(DXX) Low Power Communication Device Transmitter

The product was received on Dec. 14, 2017 and testing was completed on Feb. 11, 2018. We, Sporton International (Shenzhen) 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 (Shenzhen) Inc., the test report shall not be reproduced except in full.

Eric Shih

Approved by: Eric Shih / Manager

NVLAP TESTING
NVLAP LAB CODE 600156-0

Sporton International (Shenzhen) Inc.
1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City
Guangdong Province 518055 China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR7D1404B	Rev. 01	Initial issue of report	Feb. 14, 2018

SUMMARY OF TEST RESULT

Part	FCC Rule	Description of Test	Result	Remark
3.1	15.207	AC Power Line Conducted Emissions	Complies	Under limit 17.78 dB at 0.41 MHz
3.2	2.1049	20dB & 99% Occupied Bandwidth	Complies	-
3.3	15.249(a)	Field Strength of Fundamental Emissions	Complies	Under limit 1.86 dB at 916.00 MHz for Quasi-Peak
3.3	15.249(a)(d)	Radiated Spurious Emissions	Complies	Under limit 5.71 dB at 259.89 MHz
3.4	15.203	Antenna Requirements	Complies	-

1 General Description

1.1 Applicant

Ness Corporation
4/167 Prospect Hwy, SEVEN HILLS, NSW 2147 AUSTRALIA

1.2 Manufacturer

Ness Corporation
4/167 Prospect Hwy, SEVEN HILLS, NSW 2147 AUSTRALIA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Hub
Brand Name	Mezzo
Model Name	Mezzo-915
FCC ID	O2K-MEZZO915LTE
EUT supports Radios application	WCDMA/HSDPA/LTE/SRD/Z-wave WLAN 2.4GHz 802.11b/g/n HT20/HT40
IMEI Code	Conducted: 355285080003062 Conduction: N/A Radiation: 355285080002990
HW Version	2
SW Version	00.02.17
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 of Equipment Under Test

Standards-related Product Specification	
Frequency Range	40 kbps: 908.4 MHz 9.6 kbps: 908.42 MHz 100 kbps: 916 MHz
Channel Bandwidth (99%)	40 kbps: 291.91 kHz 9.6 kbps: 289.51 kHz 100 kbps: 275.72 kHz
Max. Field Strength (Quasi-Peak)	40 kbps: 90.30 dBμV/m 9.6 kbps: 90.30 dBμV/m 100 kbps: 92.14 dBμV/m
Antenna Type / Gain	Fixed Internal Antenna with gain 2.15 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 Location

Sporton International (Shenzhen) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No are CN5018 and CN5019.

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City Guangdong Province 518055 China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595		
Test Site No.	**Sporton Site No.**		**FCC Test Firm Registration No.**
	TH01-SZ	CO01-SZ	251365

Test Site	Sporton International (Shenzhen) Inc.	
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District Shenzhen City Guangdong Province 518055 China TEL: +86-755-3320-2398	
Test Site No.	**Sporton Site No.**	**FCC Test Firm Registration No.**
	03CH04-SZ	577730

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 Descriptions of Test Mode

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:

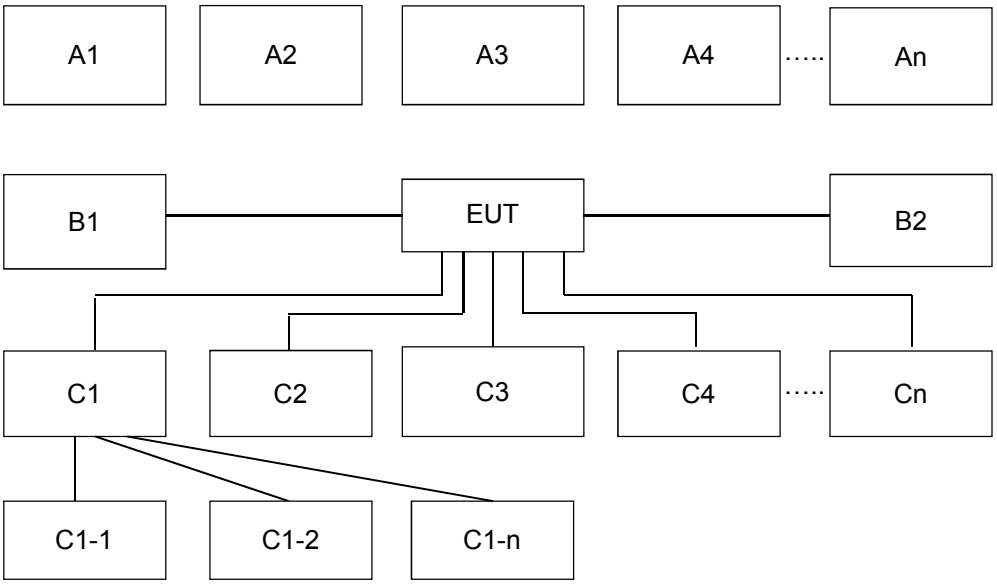
1. CTX=continuously transmitting.
2. The programmed RF utility, “Test Tool” installed in the notebook to make the EUT get into the engineering modes to continuously transmit.

2.2 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	**Z-wave**
Conducted TCs	Mode 1: 40kbps Mode 2: 9.6kbps Mode 3: 100kbps
Radiated TCs	Mode 1: 40kbps Mode 2: 9.6kbps Mode 3: 100kbps
AC Conducted Emission	Mode 1: WCDMA Band V Idle + Z-wave Tx + WLAN Link + Adapter
Remark: For Radiated TCs, The tests were performance with Adapter.	

2.3 Test Configurations



Conduction Test Setup											
No.	Wireless Station	Connection Type	Test Mode								
			1								
A1	System Simulator	GSM/ WCDMA/LTE	X								
A2	AP router	WiFi	X								
A3	Notebook	WiFi	X								
No.	**Power Source**	**Connection Type**	**1**								
B1	AC : 120V/60Hz	AC Power Cable	X								

Radiation Test Setup								
No.	Power Source	Connection Type	Test Mode					
			1	2	3			
B1	AC : 120V/60Hz	AC Power Cable	X	X	X			

2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	Dlink	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
3.	Notebook	Lenovo	E540	FCC DoC	N/A	Shielded cable DC O/P 1.8 m Unshielded AC I/P cable1.2 m

2.5 EUT Operation Test Setup

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 4.0 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 4.0 + 10 = 14.0 (dB)

3 Test Result

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

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 (MHz)	QP Limit (dBµV)	AV Limit (dBµV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

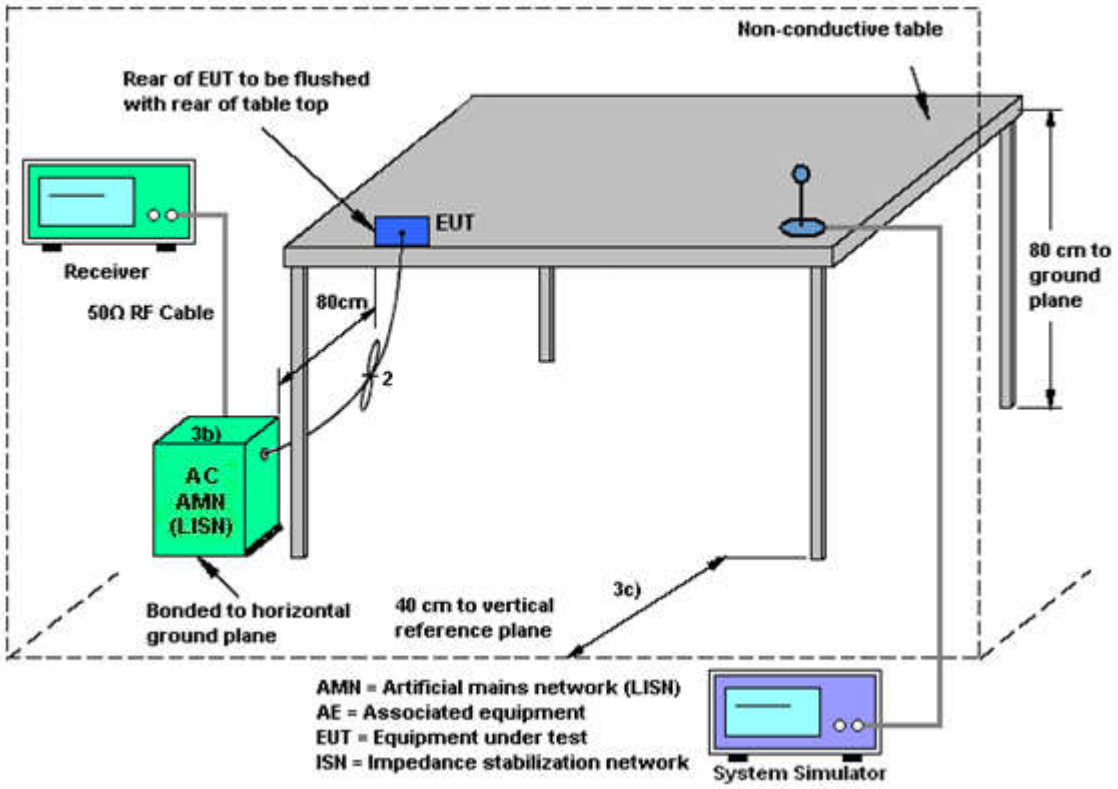
3.1.2 Measuring Instruments

Please refer to section 4 of equipment list in this report.

3.1.3 Test Procedures

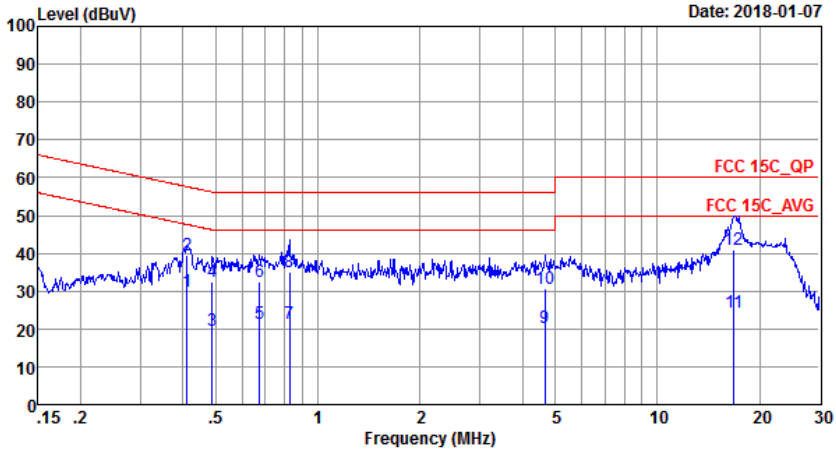
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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



3.1.5 Test Result of AC Conducted Emission

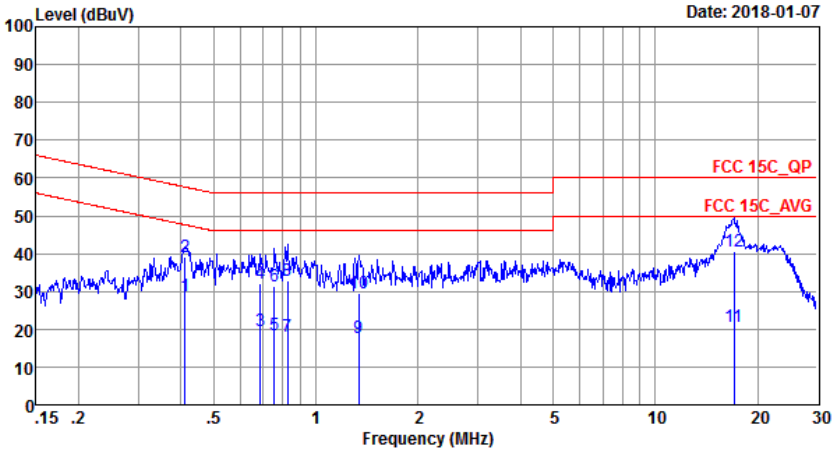
Test Mode :	Mode 1	Temperature :	22~25℃
Test Engineer :	Peng Wang	Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WCDMA Band V Idle + Z-wave Tx + WLAN Link + Adapter		



Site : CO01-SZ
Condition: FCC 15C QP LISN_20170907_L LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.41	29.81	-17.78	47.59	19.70	0.03	10.08	Average
2	0.41	39.51	-18.08	57.59	29.40	0.03	10.08	QP
3	0.49	19.70	-26.49	46.19	9.60	0.02	10.08	Average
4	0.49	32.50	-23.69	56.19	22.40	0.02	10.08	QP
5	0.67	21.40	-24.60	46.00	11.30	0.02	10.08	Average
6	0.67	32.50	-23.50	56.00	22.40	0.02	10.08	QP
7	0.83	21.43	-24.57	46.00	11.30	0.04	10.09	Average
8	0.83	35.03	-20.97	56.00	24.90	0.04	10.09	QP
9	4.67	20.47	-25.53	46.00	10.10	0.19	10.18	Average
10	4.67	30.57	-25.43	56.00	20.20	0.19	10.18	QP
11	16.84	24.32	-25.68	50.00	13.10	0.83	10.39	Average
12	16.84	41.02	-18.98	60.00	29.80	0.83	10.39	QP

Test Mode :	Mode 1	Temperature :	22~25℃
Test Engineer :	Peng Wang	Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + Z-wave Tx + WLAN Link + Adapter		



Site : CO01-SZ
Condition: FCC 15C QP LISN_20170907_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.41	28.70	-18.89	47.59	18.60	0.02	10.08	Average
2	*	0.41	39.20	-18.39	57.59	29.10	0.02	10.08	QP
3		0.69	19.50	-26.50	46.00	9.40	0.02	10.08	Average
4		0.69	32.20	-23.80	56.00	22.10	0.02	10.08	QP
5		0.75	18.41	-27.59	46.00	8.30	0.03	10.08	Average
6		0.75	31.51	-24.49	56.00	21.40	0.03	10.08	QP
7		0.83	18.22	-27.78	46.00	8.10	0.03	10.09	Average
8		0.83	32.72	-23.28	56.00	22.60	0.03	10.09	QP
9		1.34	17.55	-28.45	46.00	7.40	0.05	10.10	Average
10		1.34	29.35	-26.65	56.00	19.20	0.05	10.10	QP
11		17.02	20.72	-29.28	50.00	9.89	0.44	10.39	Average
12		17.02	40.62	-19.38	60.00	29.79	0.44	10.39	QP

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.

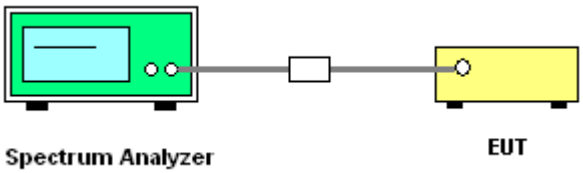
3.2.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

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 Setup

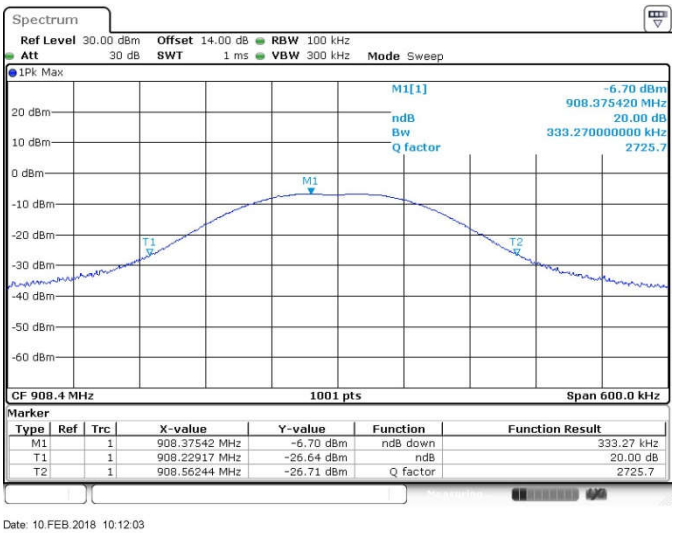


3.2.5 Test Result of 20dB Spectrum Bandwidth

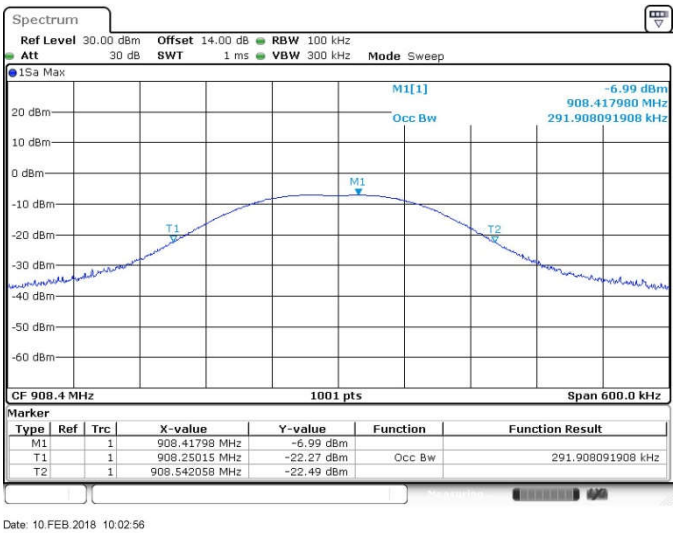
Temperature :	22~26℃	Relative Humidity :	50~53%
Test Engineer :	Wilson Chen	Test Voltage :	120Vac / 60Hz

Frequency	20dB BW (kHz)	99% OBW (kHz)
40kbps	333.27	291.91
9.6kbps	335.06	289.51
100kbps	336.26	275.72

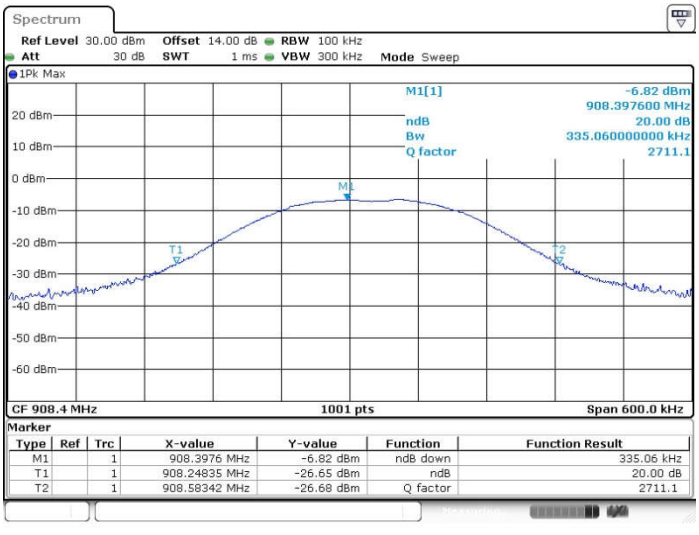
20 dB Bandwidth Plot on 40kbps



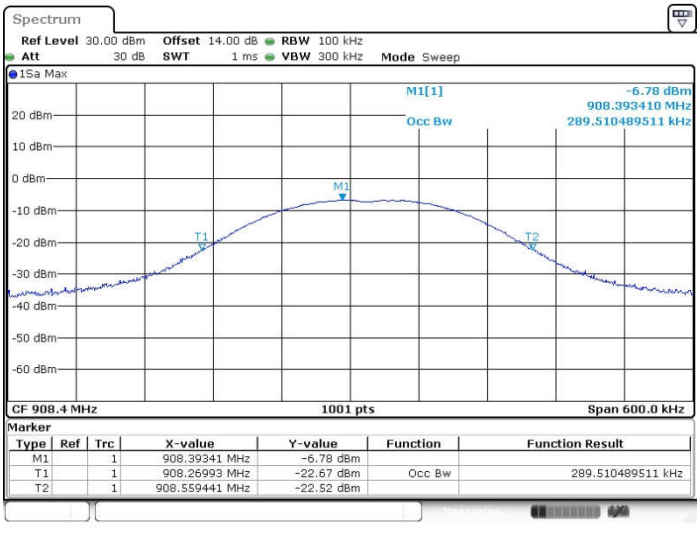
99% Bandwidth Plot on 40kbps



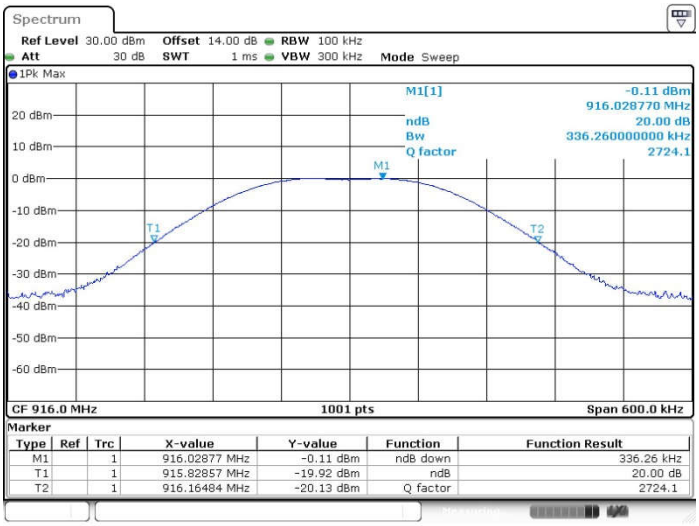
20 dB Bandwidth Plot on 9.6kbps



99% Bandwidth Plot on 9.6kbps



20 dB Bandwidth Plot on 100kbps



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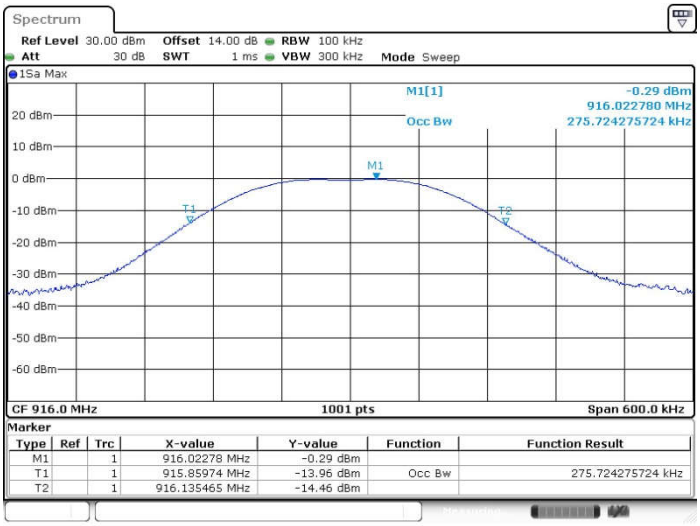
99% Bandwidth Plot on 100kbps



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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

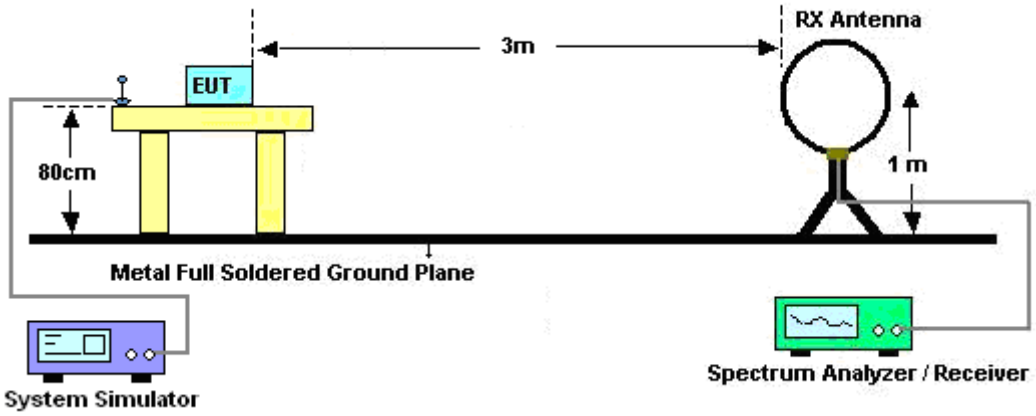
The section 4.0 of List of Measuring Equipment of this test report is used for test.

3.3.3 Test Procedures

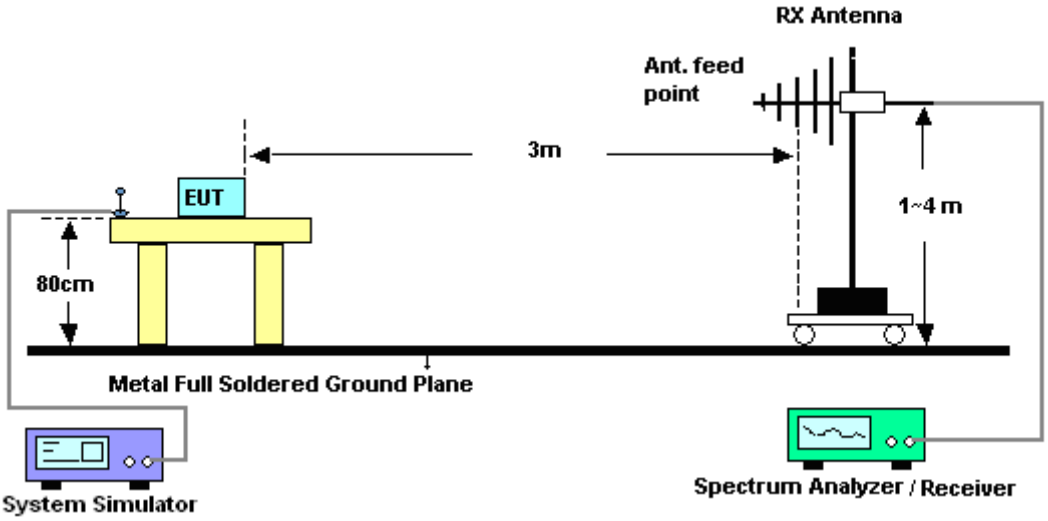
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, 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

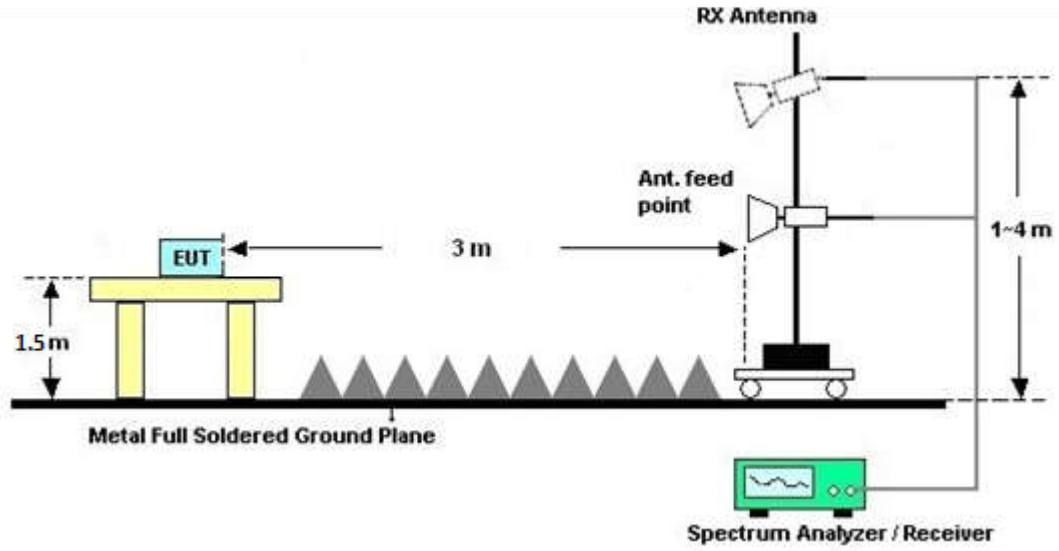
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

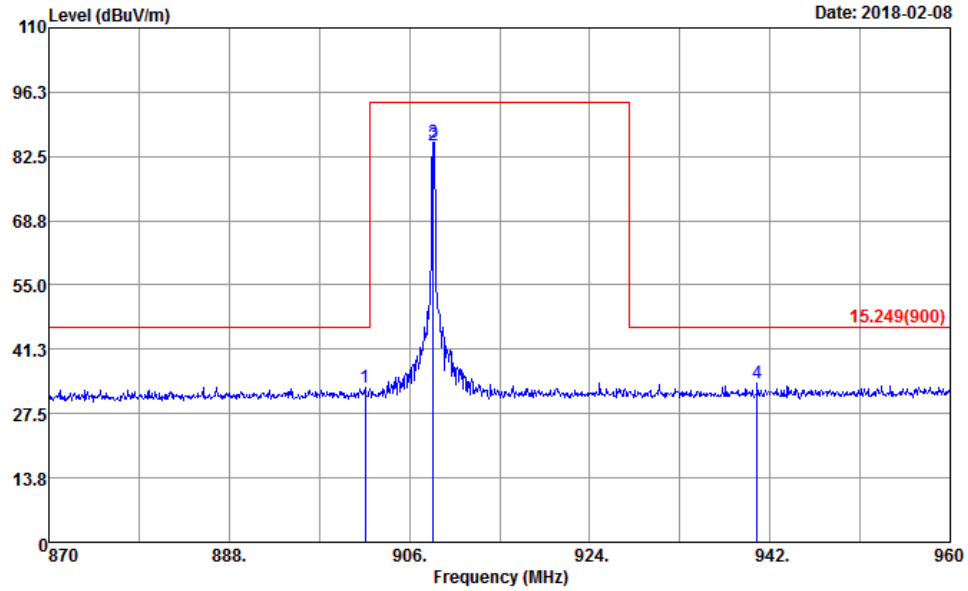
3.3.7 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

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.

3.3.8 Test Result of Field Strength of Fundamental Emissions

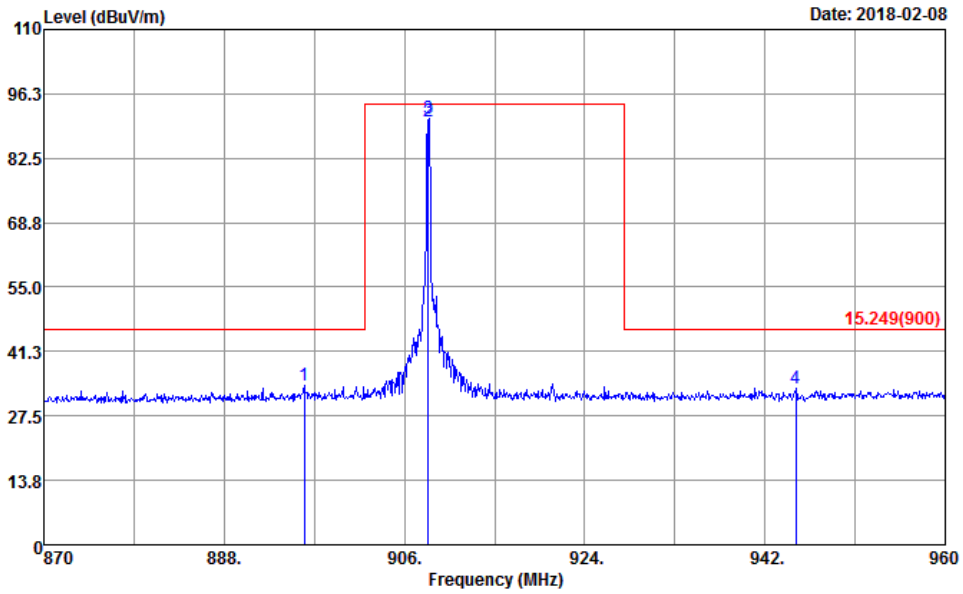
Temperature :	22~25℃	Relative Humidity :	48~52%
Test Engineer :	Fuquan Wu	Test Voltage :	120Vac / 60Hz

40kbps



Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 HORIZONTAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto

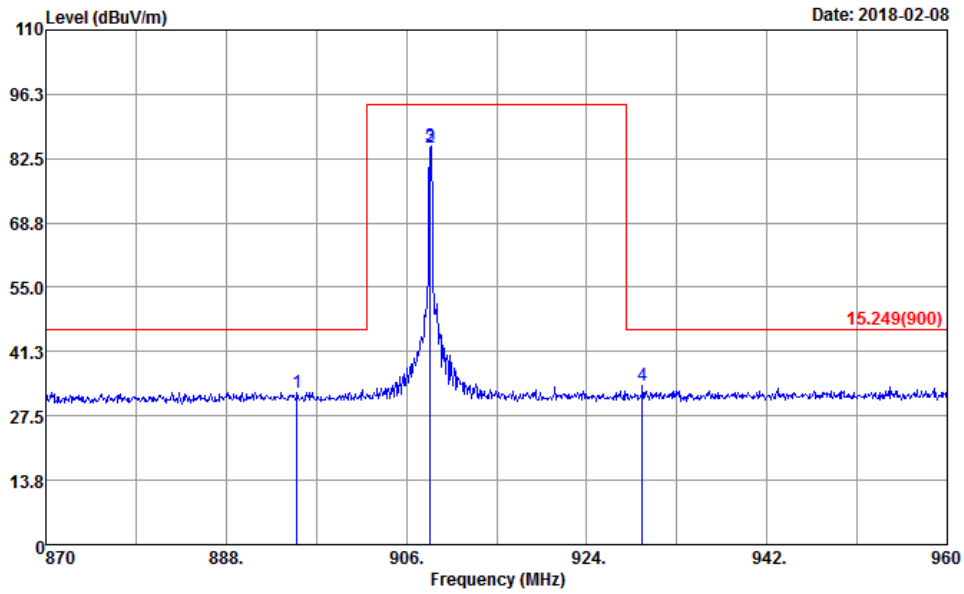
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	901.59	32.95	-13.05	46.00	31.40	29.32	3.39	31.16	100	210	Peak
2	908.40	84.83	-9.17	94.00	83.22	29.40	3.40	31.19	100	210	QP
3	908.40	85.39	-8.61	94.00	83.78	29.40	3.40	31.19	100	210	Peak
4	940.74	33.94	-12.06	46.00	32.00	29.79	3.46	31.31	100	210	Peak



Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 VERTICAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto

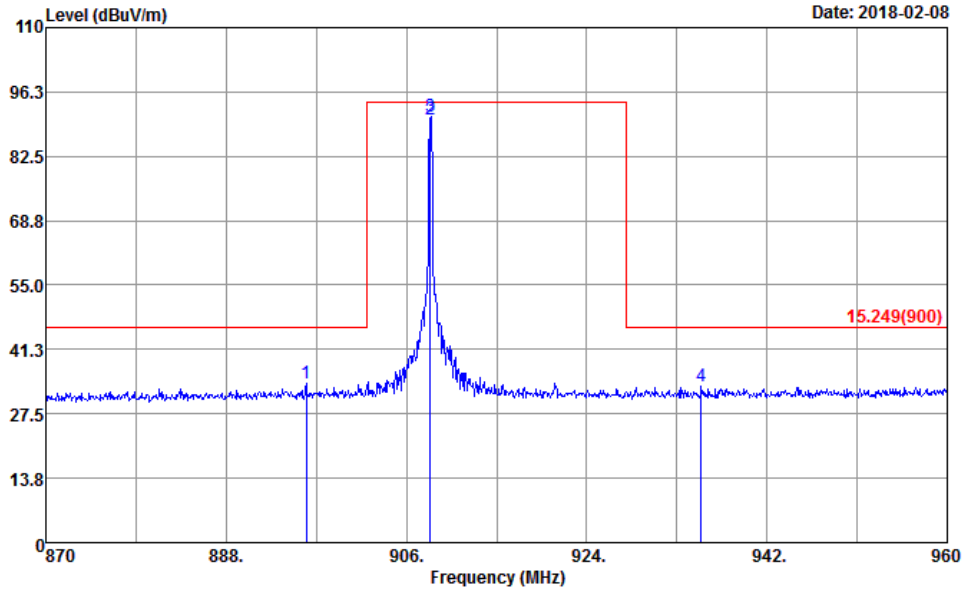
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	896.01	33.99	-12.01	46.00	32.50	29.27	3.38	31.16	100	208	Peak
2	908.40	90.30	-3.70	94.00	88.69	29.40	3.40	31.19	100	208	QP
3	908.40	90.93	-3.07	94.00	89.32	29.40	3.40	31.19	100	208	Peak
4	945.06	33.38	-12.62	46.00	31.40	29.84	3.46	31.32	100	208	Peak

9.6kbps



Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 HORIZONTAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto

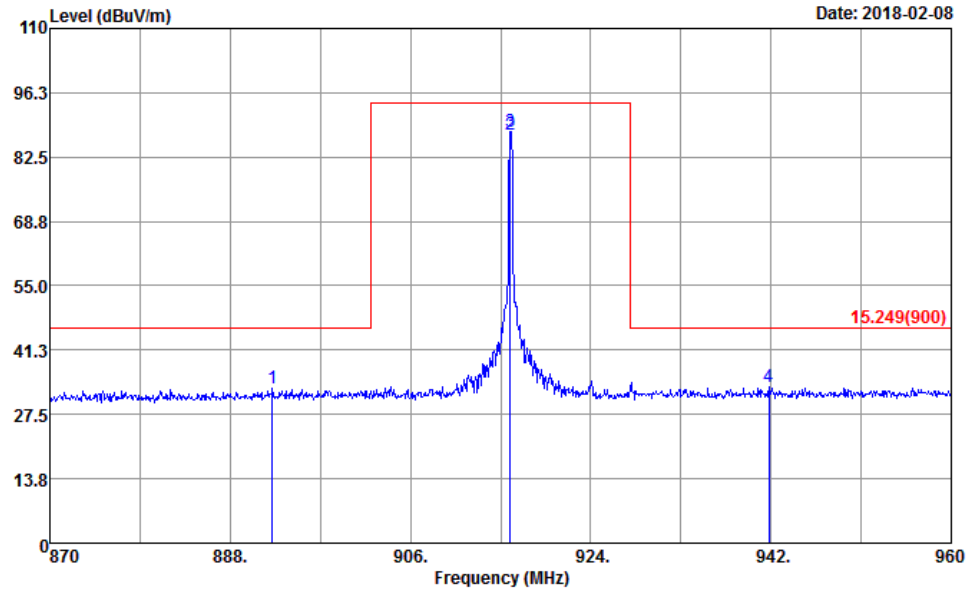
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	895.11	32.58	-13.42	46.00	31.10	29.26	3.38	31.16	100	258	Peak
2	908.40	84.86	-9.14	94.00	83.25	29.40	3.40	31.19	100	258	QP
3	908.40	85.33	-8.67	94.00	83.72	29.40	3.40	31.19	100	258	Peak
4	929.58	33.94	-12.06	46.00	32.12	29.65	3.44	31.27	100	258	Peak



Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 VERTICAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto

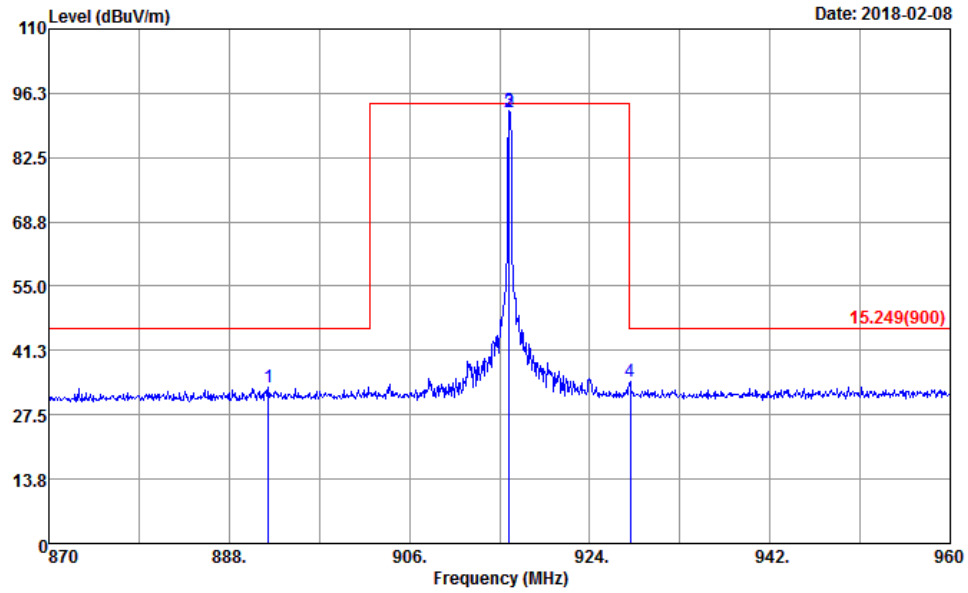
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	896.01	34.05	-11.95	46.00	32.56	29.27	3.38	31.16	100	287	Peak
2	908.40	90.30	-3.70	94.00	88.69	29.40	3.40	31.19	100	287	QP
3	908.40	91.01	-2.99	94.00	89.40	29.40	3.40	31.19	100	287	Peak
4	935.43	33.46	-12.54	46.00	31.58	29.72	3.45	31.29	100	287	Peak

100kbps



Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 HORIZONTAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto

	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	892.23	33.06	-12.94	46.00	31.62	29.24	3.37	31.17	100	65	Peak
2	916.00	87.38	-6.62	94.00	85.68	29.49	3.42	31.21	100	65	QP
3	916.00	88.07	-5.93	94.00	86.37	29.49	3.42	31.21	100	65	Peak
4	941.82	33.39	-12.61	46.00	31.44	29.80	3.46	31.31	100	65	Peak



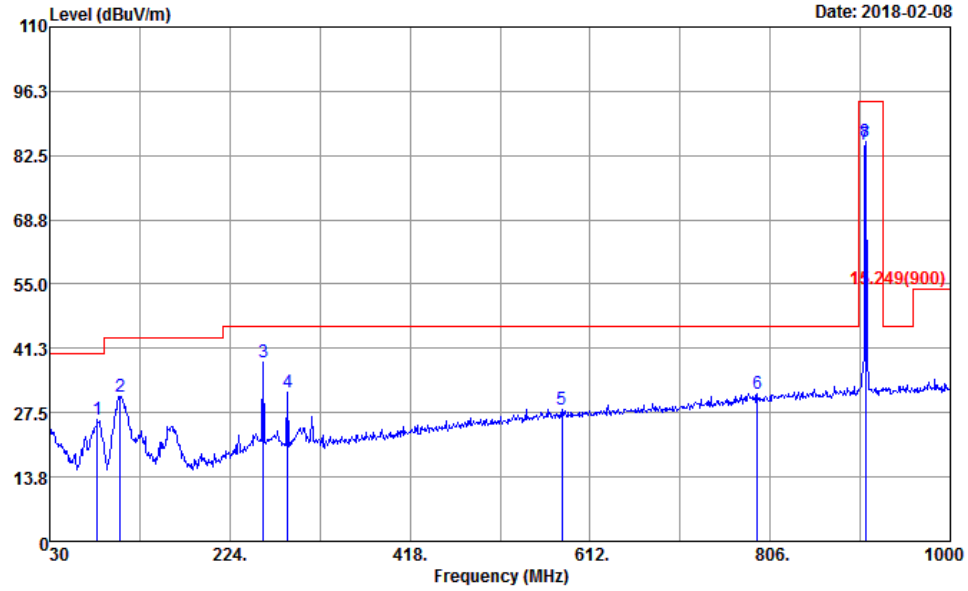
Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 VERTICAL
: RBW:120.000KHz VBW:300.000KHz SWT:Auto

	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	891.96	33.31	-12.69	46.00	31.87	29.24	3.37	31.17	100	254	Peak
2	916.00	92.14	-1.86	94.00	90.44	29.49	3.42	31.21	100	254	QP
3	916.00	92.60	-1.40	94.00	90.90	29.49	3.42	31.21	100	254	Peak
4	928.05	34.53	-11.47	46.00	32.71	29.64	3.44	31.26	100	254	Peak

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

Temperature :	22~25℃	Relative Humidity :	48~52%
Test Engineer :	Fuquan Wu	Test Voltage :	120Vac / 60Hz

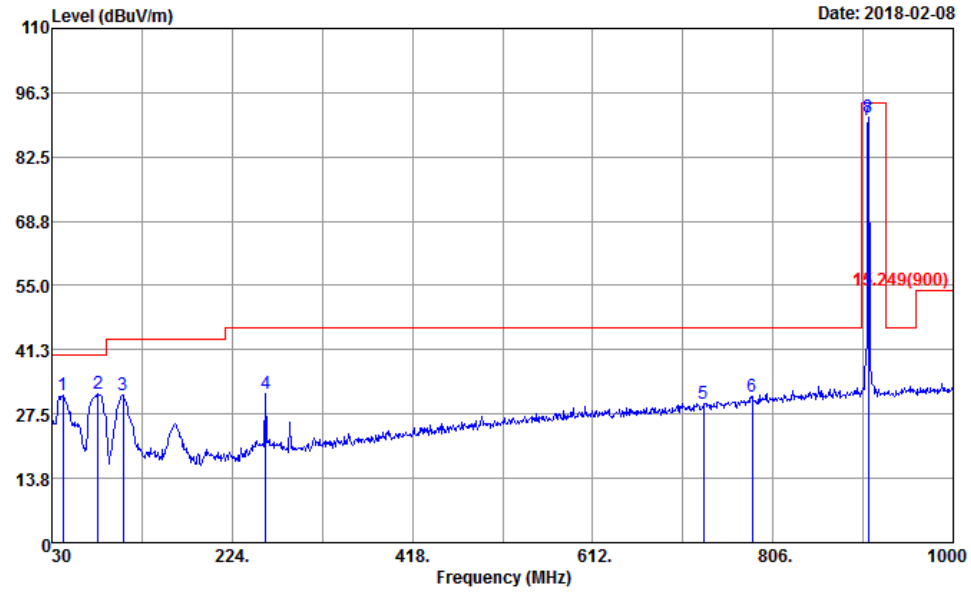
40kbps



Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 HORIZONTAL
: RBW:120.000KHz VBW:300.000KHz SWT:0.500sec

	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	81.41	25.91	-14.09	40.00	43.14	13.74	0.87	31.84	---	---	Peak
2	105.66	30.95	-12.55	43.50	44.94	16.64	1.08	31.71	---	---	Peak
3	259.89	38.44	-7.56	46.00	47.54	20.40	1.74	31.24	100	124	Peak
4	286.08	31.99	-14.01	46.00	42.29	19.12	1.81	31.23	---	---	Peak
5	581.93	28.24	-17.76	46.00	31.38	25.47	2.65	31.26	---	---	Peak
6	792.42	31.46	-14.54	46.00	31.13	28.36	3.14	31.17	---	---	Peak
7	908.40	84.82			83.21	29.40	3.40	31.19	100	251	QP
8	908.40	85.40			83.79	29.40	3.40	31.19	---	---	Peak

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

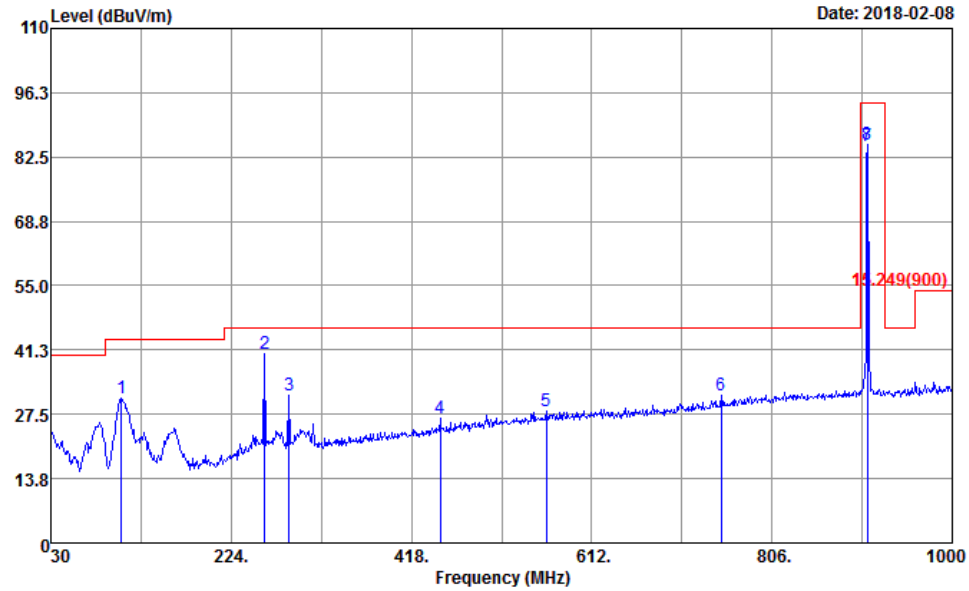


Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 VERTICAL
: RBW:120.000KHz VBW:300.000KHz SWT:0.500sec

	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	41.64	31.69	-8.31	40.00	44.06	19.16	0.44	31.97	---	---	Peak
2	79.47	31.94	-8.06	40.00	49.42	13.52	0.84	31.84	100	248	Peak
3	106.63	31.55	-11.95	43.50	45.46	16.70	1.09	31.70	---	---	Peak
4	259.89	31.82	-14.18	46.00	40.92	20.40	1.74	31.24	---	---	Peak
5	731.31	29.71	-16.29	46.00	30.69	27.26	2.99	31.23	---	---	Peak
6	783.69	31.26	-14.74	46.00	31.11	28.20	3.12	31.17	---	---	Peak
7	908.40	90.28			88.67	29.40	3.40	31.19	100	30	QP
8	908.40	90.89			89.28	29.40	3.40	31.19	---	---	Peak

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

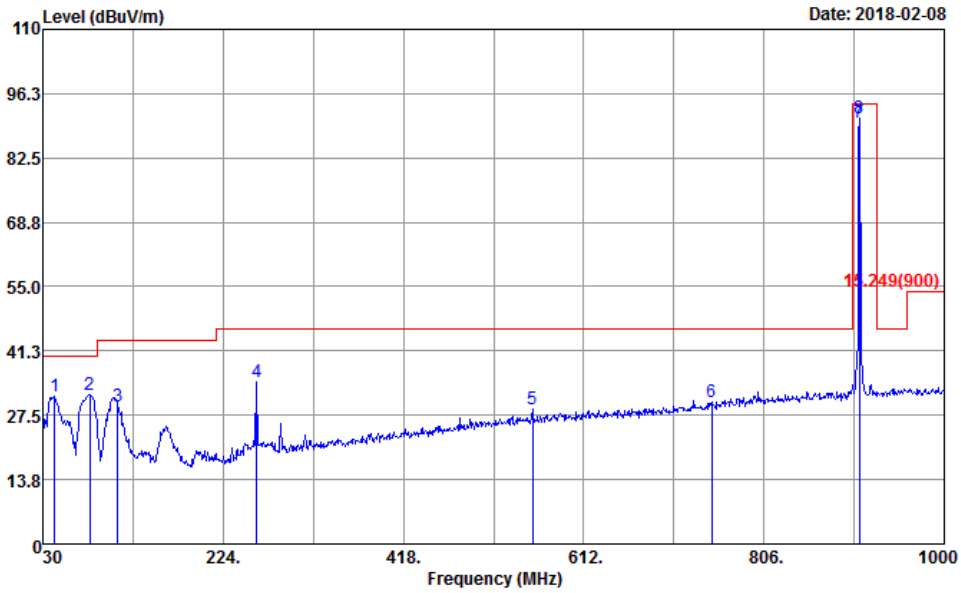
9.6kbps



Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 HORIZONTAL
: RBW:120.000KHz VBW:300.000KHz SWT:0.500sec

	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	105.66	30.99	-12.51	43.50	44.98	16.64	1.08	31.71	---	---	Peak
2	259.89	40.29	-5.71	46.00	49.39	20.40	1.74	31.24	100	285	Peak
3	286.08	31.47	-14.53	46.00	41.77	19.12	1.81	31.23	---	---	Peak
4	449.04	26.59	-19.41	46.00	32.65	22.93	2.30	31.29	---	---	Peak
5	563.50	28.12	-17.88	46.00	31.64	25.14	2.60	31.26	---	---	Peak
6	751.68	31.60	-14.40	46.00	32.14	27.63	3.04	31.21	---	---	Peak
7	908.40	84.76			83.15	29.40	3.40	31.19	100	210	QP
8	908.40	85.29			83.68	29.40	3.40	31.19	---	---	Peak

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

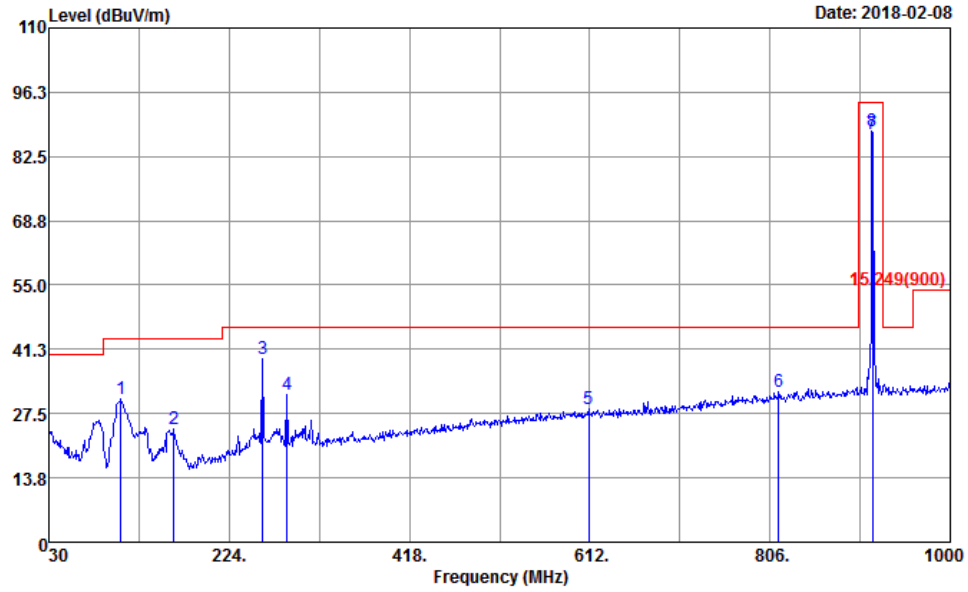


Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 VERTICAL
: RBW:120.000KHz VBW:300.000KHz SWT:0.500sec

	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	42.61	31.48	-8.52	40.00	44.34	18.65	0.46	31.97	---	---	Peak
2	80.44	31.85	-8.15	40.00	49.24	13.60	0.85	31.84	100	286	Peak
3	110.51	29.43	-14.07	43.50	43.09	16.93	1.10	31.69	---	---	Peak
4	259.89	34.57	-11.43	46.00	43.67	20.40	1.74	31.24	---	---	Peak
5	556.71	28.94	-17.06	46.00	32.60	25.01	2.58	31.25	---	---	Peak
6	749.74	30.18	-15.82	46.00	30.77	27.59	3.03	31.21	---	---	Peak
7	908.40	90.16			88.55	29.40	3.40	31.19	100	254	QP
8	908.40	90.95			89.34	29.40	3.40	31.19	---	---	Peak

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

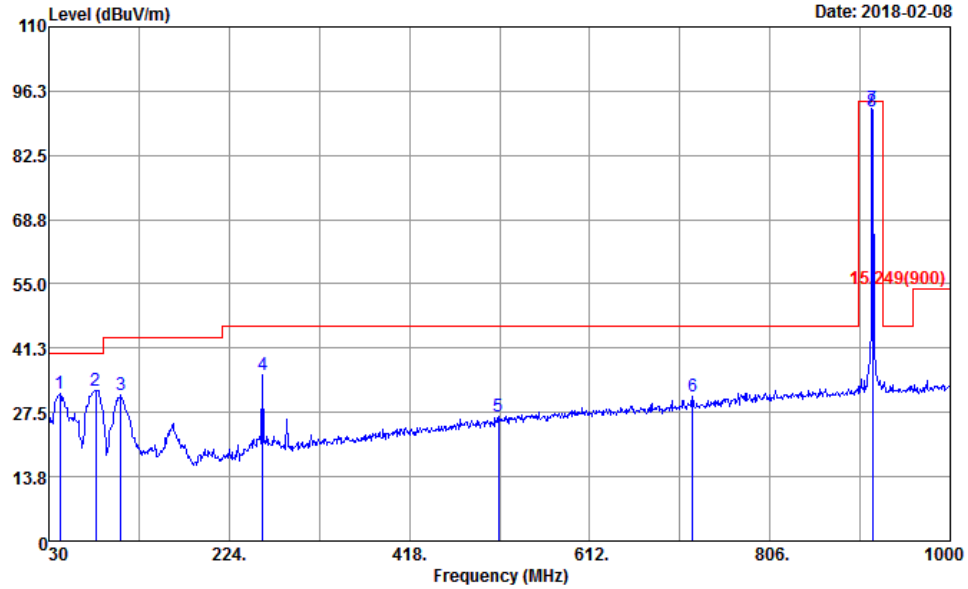
100kbps



Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 HORIZONTAL
: RBW:120.000KHz VBW:300.000KHz SWT:0.500sec

	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	107.60	30.49	-13.01	43.50	44.34	16.76	1.09	31.70	---	---	Peak
2	164.83	24.11	-19.39	43.50	38.20	16.07	1.33	31.49	---	---	Peak
3	259.89	39.11	-6.89	46.00	48.21	20.40	1.74	31.24	100	29	Peak
4	286.08	31.52	-14.48	46.00	41.82	19.12	1.81	31.23	---	---	Peak
5	611.03	28.59	-17.41	46.00	31.22	25.90	2.73	31.26	---	---	Peak
6	815.70	32.23	-13.77	46.00	31.59	28.62	3.19	31.17	---	---	Peak
7	916.00	87.34			85.64	29.49	3.42	31.21	100	253	QP
8	916.00	87.95			86.25	29.49	3.42	31.21	---	---	Peak

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



Site : 03CH04-SZ
Condition : 15.249(900) 3m LF_ANT41909_6 VERTICAL
: RBW:120.000KHz VBW:300.000KHz SWT:0.500sec

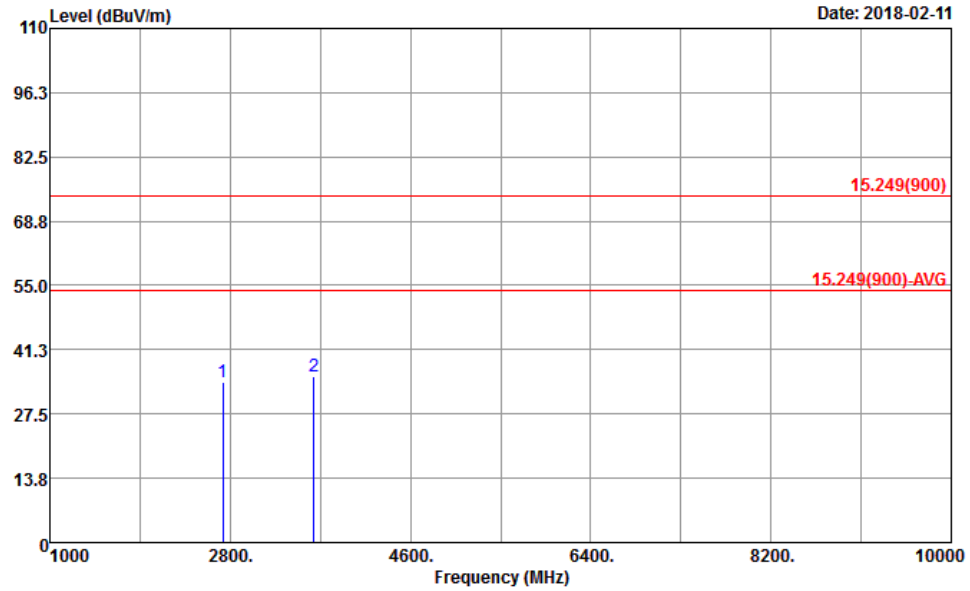
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	41.64	31.57	-8.43	40.00	43.94	19.16	0.44	31.97	---	---	Peak
2	80.44	32.31	-7.69	40.00	49.70	13.60	0.85	31.84	100	289	Peak
3	107.60	31.31	-12.19	43.50	45.16	16.76	1.09	31.70	---	---	Peak
4	259.89	35.43	-10.57	46.00	44.53	20.40	1.74	31.24	---	---	Peak
5	514.03	26.51	-19.49	46.00	31.04	24.24	2.47	31.24	---	---	Peak
6	722.58	30.87	-15.13	46.00	32.03	27.10	2.98	31.24	---	---	Peak
7	916.00	92.54			90.84	29.49	3.42	31.21	---	---	Peak
8	916.00	92.04			90.34	29.49	3.42	31.21	100	325	Peak

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

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

Temperature :	22~25℃	Relative Humidity :	48~52%
Test Engineer :	Fuquan Wu	Test Voltage :	120Vac / 60Hz

40kbps

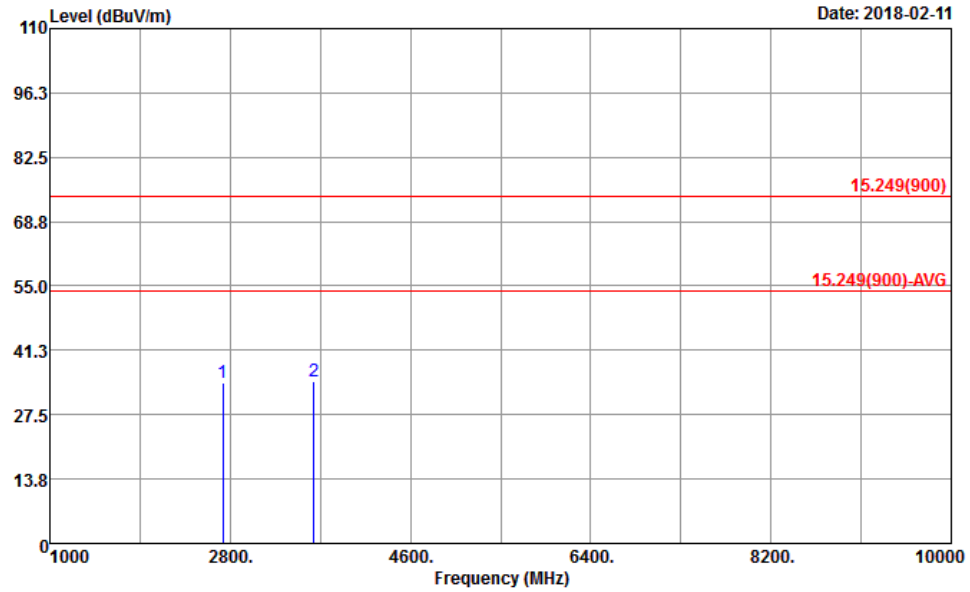


Site : 03CH04-SZ
Condition : 15.249(900) 3m HF_ANT_9120D-1474 HORIZONTAL

	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	2725.20	34.28	-39.72	74.00	58.67	28.10	5.10	57.59	190	235	Peak
2	3633.60	35.46	-38.54	74.00	60.29	29.03	4.91	58.77	150	210	Peak

Note:

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.



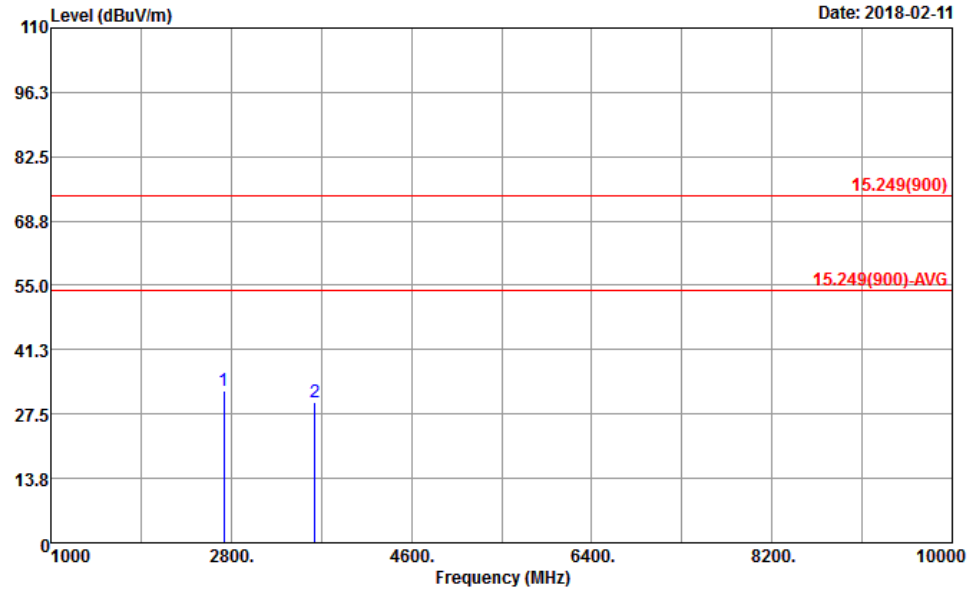
Site : 03CH04-SZ
Condition : 15.249(900) 3m HF_ANT_9120D-1474 VERTICAL

	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	2725.20	34.22	-39.78	74.00	58.61	28.10	5.10	57.59	190	235	Peak
2	3633.60	34.65	-39.35	74.00	59.48	29.03	4.91	58.77	150	210	Peak

Note:

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.

9.6kbps

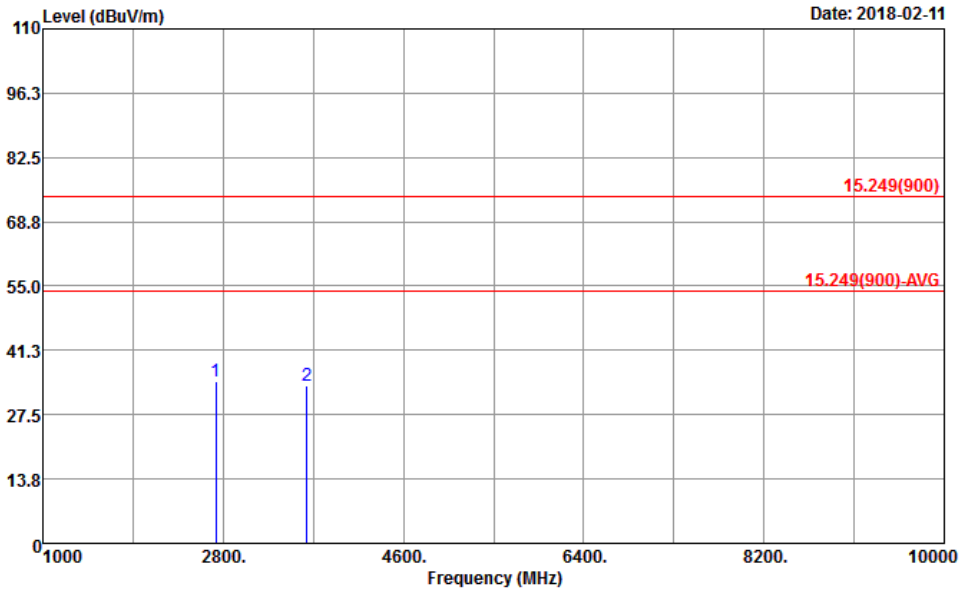


Site : 03CH04-SZ
Condition : 15.249(900) 3m HF_ANT_9120D-1474 HORIZONTAL

	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	2725.20	32.60	-41.40	74.00	56.99	28.10	5.10	57.59	190	235	Peak
2	3633.60	30.12	-43.88	74.00	54.95	29.03	4.91	58.77	150	205	Peak

Note:

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.



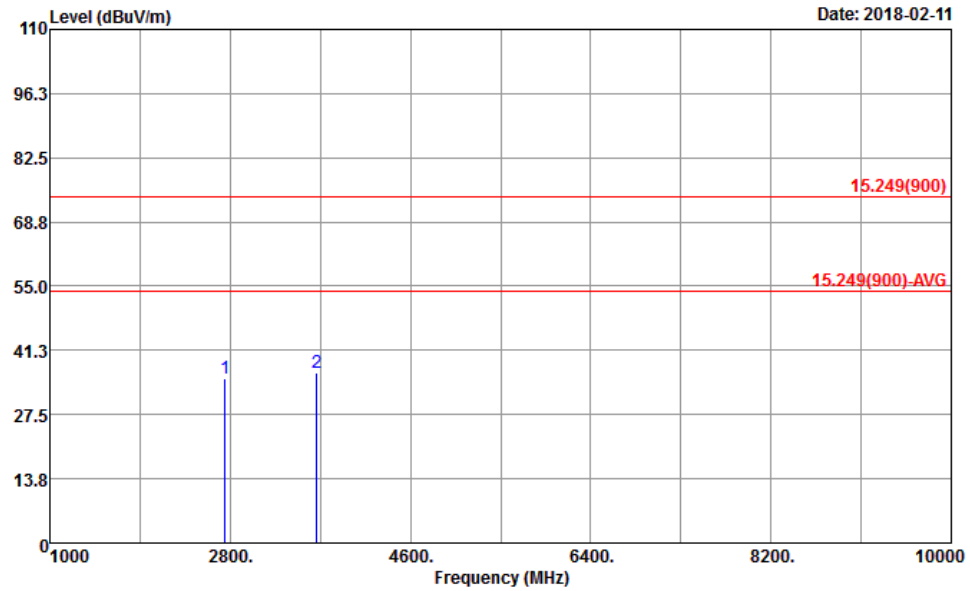
Site : 03CH04-SZ
Condition : 15.249(900) 3m HF_ANT_9120D-1474 VERTICAL

	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	2725.20	34.53	-39.47	74.00	58.92	28.10	5.10	57.59	190	235	Peak
2	3633.60	33.64	-40.36	74.00	58.47	29.03	4.91	58.77	150	205	Peak

Note:

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.

100kbps

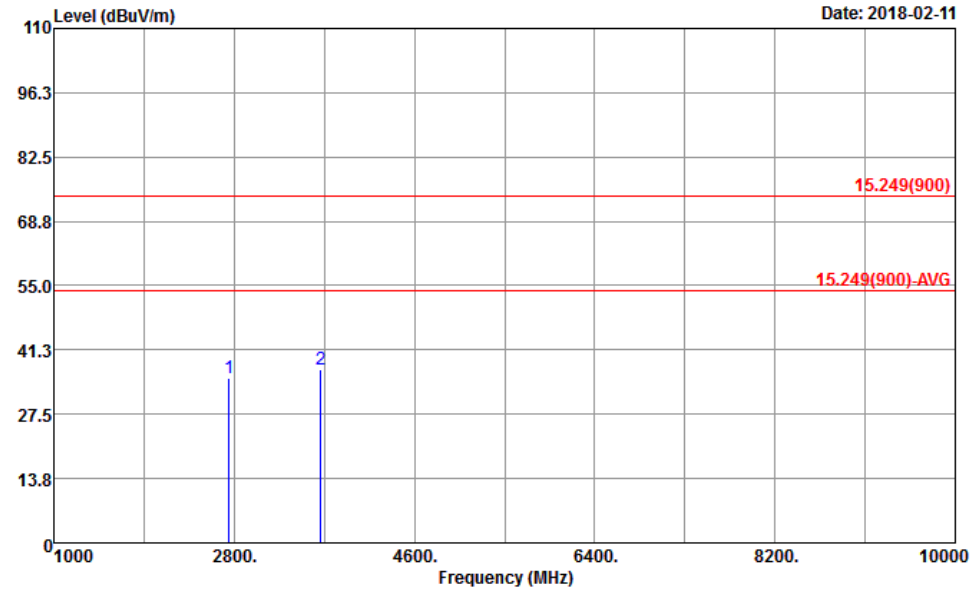


Site : 03CH04-SZ
Condition : 15.249(900) 3m HF_ANT_9120D-1474 HORIZONTAL

	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	2748.00	35.10	-38.90	74.00	59.36	28.15	5.14	57.55	189	238	Peak
2	3664.00	36.33	-37.67	74.00	61.16	29.11	4.91	58.85	150	200	Peak

Note:

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 : 03CH04-SZ
Condition : 15.249(900) 3m HF_ANT_9120D-1474 VERTICAL

	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	2748.00	35.39	-38.61	74.00	59.65	28.15	5.14	57.55	189	238	Peak
2	3664.00	37.13	-36.87	74.00	61.96	29.11	4.91	58.85	150	200	Peak

Note:

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.

3.4 Antenna Requirements

3.4.1 Standard Applicable

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 Anti-Replacement Construction

An embedded-in antenna design is used.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	9kHz~40GHz	Apr. 20, 2017	Feb. 10, 2018	Apr. 19, 2018	Conducted (TH01-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 26, 2017	Jan. 07, 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Dec. 26, 2017	Jan. 07, 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103892	9kHz~30MHz	Nov. 01, 2017	Jan. 07, 2018	Oct. 31, 2018	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 19, 2017	Jan. 07, 2018	Jul. 18, 2018	Conduction (CO01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Apr. 20, 2017	Feb. 08, 2018~ Feb. 11, 2018	Apr. 19, 2018	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 20, 2017	Feb. 08, 2018~ Feb. 11, 2018	Apr. 19, 2018	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2017	Feb. 08, 2018~ Feb. 11, 2018	May 13, 2018	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 16, 2017	Feb. 08, 2018~ Feb. 11, 2018	May 15, 2018	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120 D	9120D-1285	1GHz~18GHz	Dec. 13, 2017	Feb. 08, 2018~ Feb. 11, 2018	Dec. 12, 2018	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 19, 2017	Feb. 08, 2018~ Feb. 11, 2018	Oct. 18, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-10P-R	1989346	1GHz~18GHz	Jul. 27, 2017	Feb. 08, 2018~ Feb. 11, 2018	Jul. 26, 2018	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Feb. 08, 2018~ Feb. 11, 2018	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Feb. 08, 2018~ Feb. 11, 2018	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Feb. 08, 2018~ Feb. 11, 2018	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.6dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.8dB**