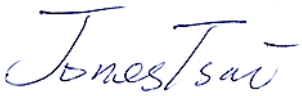
FCC Test Report

APPLICANT	:	Bragi GmbH
EQUIPMENT	:	Wireless Headphone
BRAND NAME	:	BRAGI
MODEL NAME	:	H1000-0001R
FCC ID	:	2AF5TH1000R
STANDARD	:	FCC Part 15 Subpart C
CLASSIFICATION	:	Low Power Communication Device Transmitter (DXX)

The product was received on Oct. 05, 2016 and completely tested on Oct. 19, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the 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

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR6O0503C	Rev. 01	Initial issue of report	Oct. 27, 2016

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049	20dB Bandwidth	-	Pass	-
3.1	-	99% Occupied Bandwidth	-	Pass	-
3.2	15.209	Field Strength of Fundamental Emissions and Radiated Emission	15.209(a)	Pass	Under limit 9.73 dB at 48.63 MHz
3.3	15.203	Antenna Requirements	–	Pass	-

1. General Description

1.1. Applicant

Bragi GmbH
Sendlinger Str.7 / Angerblock 2.OG 80331 München, Germany

1.2. Manufacturer

Merry Electronics (SHENZHEN) Co., Ltd.
Merry Ind. Park Hua Rong Rd., DaLang, BaoAn ShenZhen 518109 China

1.3. Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Wireless Headphone
Brand Name	BRAGI
Model Number	H1000-0001R
FCC ID	2AF5TH1000R
Tx /Rx Frequency	10.579 MHz
Antenna Type	Loop Antenna
EUT Stage	Production Unit

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. Modification of EUT

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

1.5. Test Location

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 Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978	
Test Site No.	**Sporton Site No.**	
	TH03-HY	03CH07-HY

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

1.6. Applied Standards

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

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

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Test Configuration of Equipment Under Test

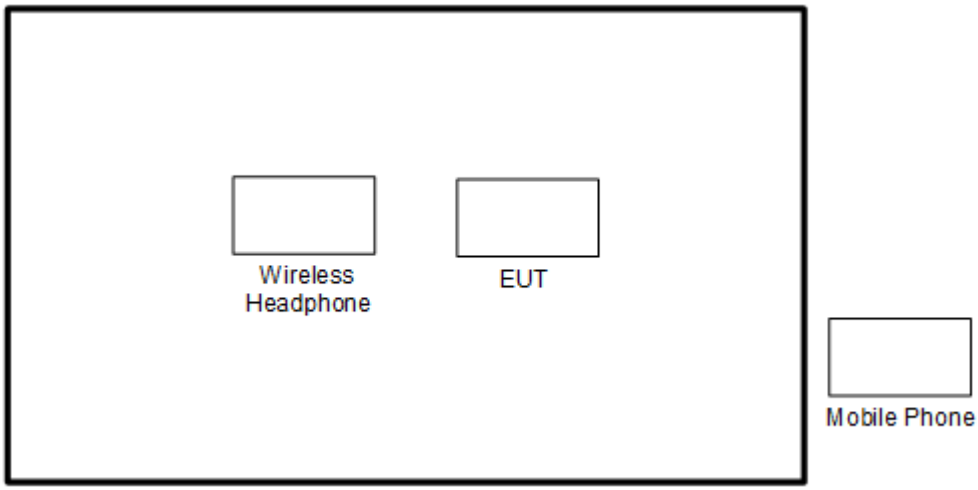
2.1. Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: radiation (9 kHz to the 1000MHz).

Test Items	Function Type
Radiated Emission	Mode 1 : 10.579 MHz Link
Remark: For radiated emission test items, mobile phone use Bluetooth function link with the EUT (right earphone), and EUT use NFMI technology to connect left earphone for music play.	

2.2. Connection Diagram of Test System



2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Wireless Headphone	BRAGI	H1000-0001L	2AF5TH1000L	N/A	N/A
2.	Mobile Phone	Apple	A1530	BCG-E2432A	N/A	N/A

3. Test Result

3.1. 20dB and 99% Occupied Bandwidth Measurement

3.1.1 Limit of 20dB and 99% Occupied Bandwidth

Reporting only

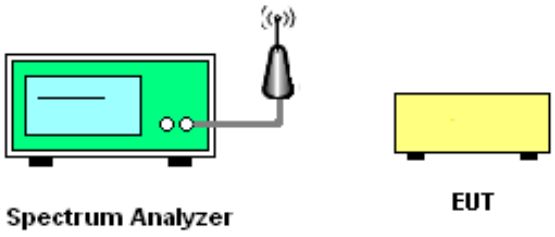
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The 20dB bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT in peak Max hold mode.
2. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
3. For Bandwidth measurement, the RBW= 10kHz, and VBW = 30kHz. Sweep = 20ms;
4. Measure and record the results in the test report.

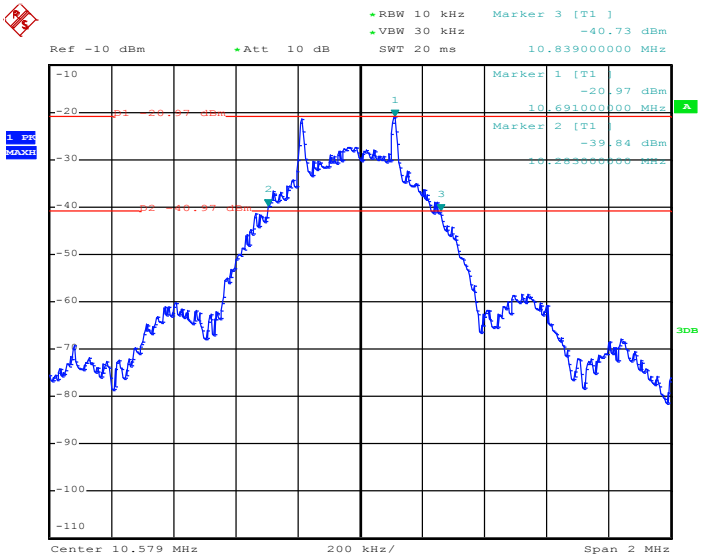
3.1.4 Test Setup



3.1.5 Test Result of 20dB and 99% Bandwidth

Test Engineer :	Ken Chen	Temperature :	25~26℃
		Relative Humidity :	45~48%

20 dB Bandwidth Plot



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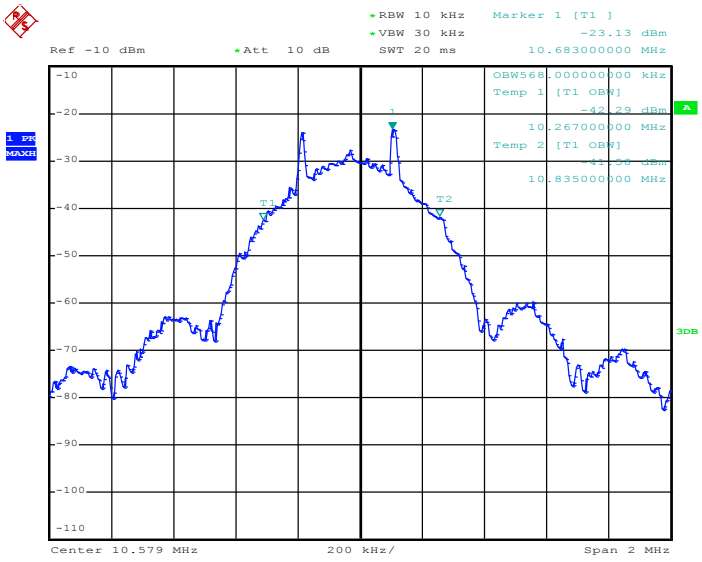
99% Occupied Bandwidth Plot



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3.2. Field Strength of Fundamental Emissions and Radiated Emission

3.2.1. Limit of Radiated Emission

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

3.2.2. Measuring Instruments

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

3.2.3. Measuring Instrument Setting

The following table is the setting of receiver.

Receiver Parameter	Setting
Attenuation	Auto
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

Note: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

3.2.4. Test Procedures

<9kHz-30MHz>

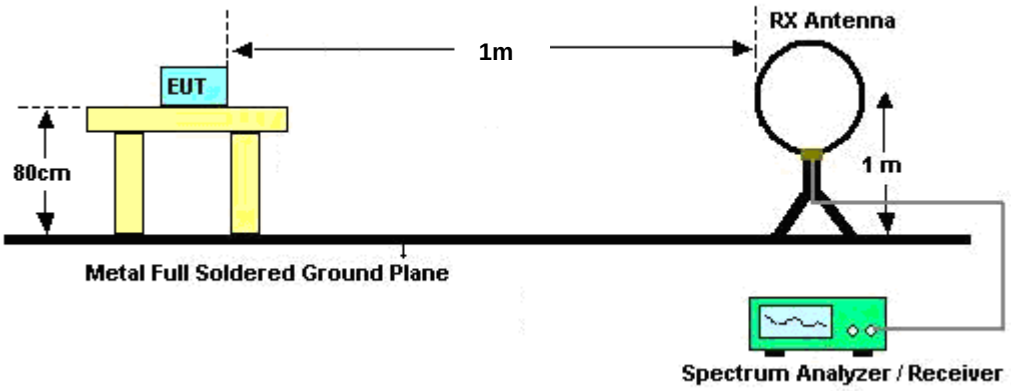
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 1 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.
4. For emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver.
5. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

<30MHz-1GHz>

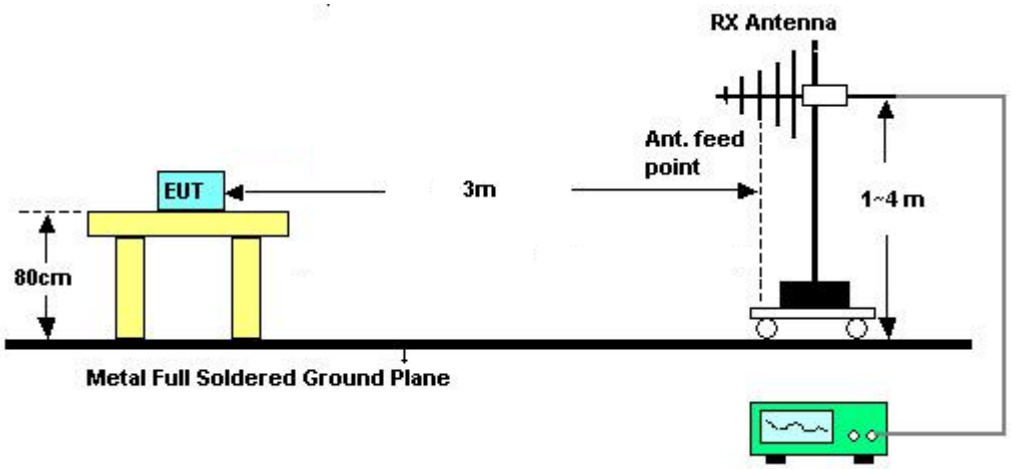
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

3.2.5. Test Setup of Radiated Emission

For radiated emissions below 30MHz



For radiated emissions above 30MHz



3.2.6. Test Result of Field Strength of Fundamental Emissions

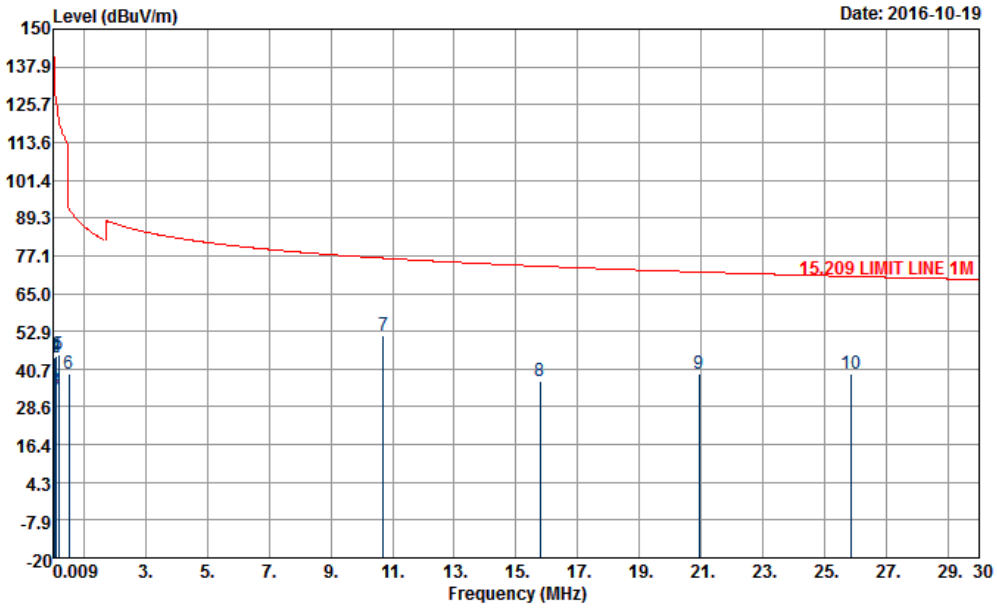
Limit		
Frequency(MHz)	Field strength (dBμV/m)	Measurement distance (m)
1.705 – 30.0	30	30

Recalculation According to ANSI C63.10		
Frequency	Formula	Correction value
10.70 MHz	$FS_{limit} = FS_{max} - 40\log(\frac{d_{nearfield}}{d_{measure}}) - 20\log(\frac{d_{limit}}{d_{nearfield}})$	-42.62

Field Strength of the fundamental		
Frequency	10.70 MHz	
Distance	@1m	@30m
Measured /calculated value (QP measurement)	51.50 dBuV/m	8.80 dBuV/m

3.2.7. Test Result of Radiated Emission (9kHz ~ 30MHz)

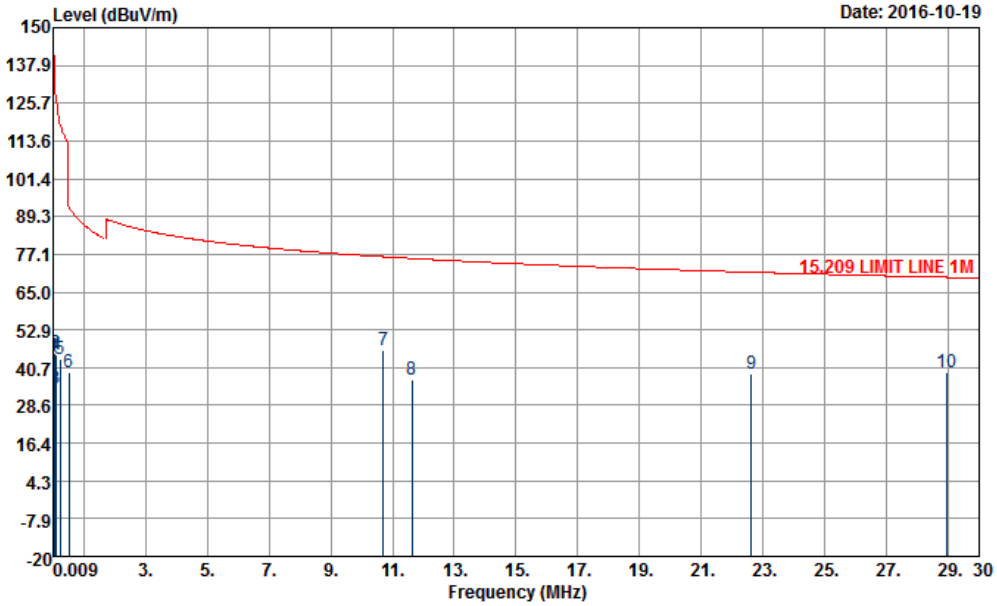
Test Mode :	Mode 1	Temperature :	25~27°C
Test Engineer :	Jesse Wang	Relative Humidity :	48~50%
Test Distance :	1m	Polarization :	Horizontal
Function Type :	10.579 MHz Link		
Remark	#7 is transmitter's fundamental signal.		



Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 1M 3m LOOP_ANT(H) HORIZONTAL
: RBW:9.000KHz VBW:27.000KHz SWT:Auto
Project : 6O0503

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	0.01	45.06	-99.16	144.22	21.48	22.90	0.68	---	---	Average
2	0.06	44.61	-85.86	130.47	24.93	19.00	0.68	---	---	Average
3	0.09	33.81	-93.77	127.58	14.33	18.80	0.68	---	---	QP
4	0.12	44.82	-80.40	125.22	25.35	18.79	0.68	---	---	Average
5	0.19	45.30	-75.87	121.17	25.86	18.76	0.68	---	---	Average
6	0.52	39.18	-53.18	92.36	19.88	18.62	0.68	---	---	QP
7	10.70	51.50	-24.86	76.36	30.88	19.94	0.68	---	---	QP
8	15.78	37.05	-36.73	73.78	15.41	20.96	0.68	---	---	QP
9	20.93	39.22	-32.67	71.89	16.29	21.86	1.07	---	---	QP
10	25.86	39.32	-31.17	70.49	16.10	22.15	1.07	100	221	QP

Test Mode :	Mode 1	Temperature :	25~27°C
Test Engineer :	Jesse Wang	Relative Humidity :	48~50%
Test Distance :	1m	Polarization :	Vertical
Function Type :	10.579 MHz Link		
Remark	#7 is transmitter's fundamental signal.		

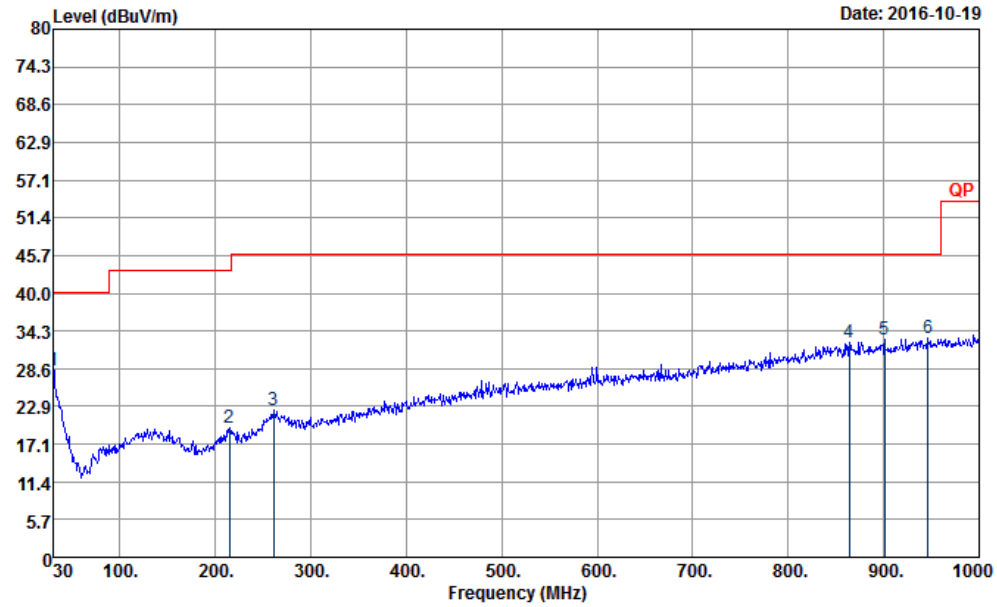


Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 1M 3m LOOP_ANT(V) VERTICAL
: RBW:9.000KHz VBW:27.000KHz SWT:Auto
Project : 6O0503

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	0.01	44.47	-99.71	144.18	20.89	22.90	0.68	---	---	Average
2	0.07	45.40	-84.59	129.99	25.72	19.00	0.68	---	---	Average
3	0.09	33.79	-93.76	127.55	14.31	18.80	0.68	---	---	QP
4	0.12	44.67	-80.55	125.22	25.20	18.79	0.68	---	---	Average
5	0.23	43.56	-76.00	119.56	24.14	18.74	0.68	---	---	Average
6	0.51	39.34	-53.15	92.49	20.04	18.62	0.68	---	---	QP
7	10.70	46.44	-29.92	76.36	25.82	19.94	0.68	---	---	QP
8	11.62	37.06	-38.75	75.81	16.26	20.12	0.68	---	---	QP
9	22.63	38.80	-32.57	71.37	15.77	21.96	1.07	---	---	QP
10	28.95	39.10	-30.64	69.74	15.69	22.34	1.07	100	33	QP

3.2.8. Test Result of Radiated Emission (30MHz ~ 1000MHz)

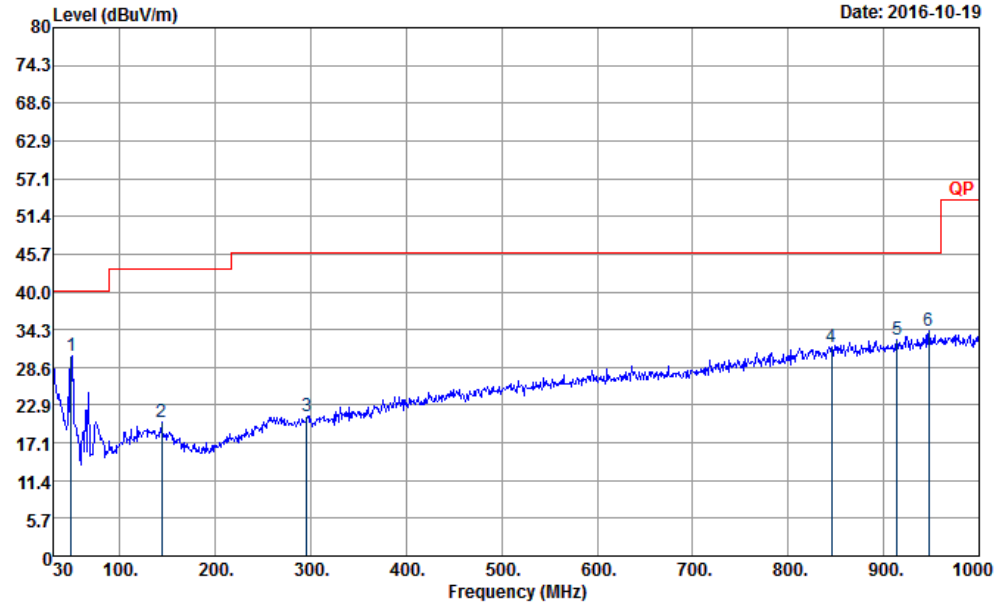
Test Mode :	Mode 1	Temperature :	25~27°C
Test Engineer :	Jesse Wang	Relative Humidity :	48~50%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	10.579 MHz Link		



Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) HORIZONTAL
Project : 6O0503

	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	30.27	28.27	-11.73	40.00	32.55	26.00	1.07	31.35	100	0	Peak
2	214.95	19.64	-23.86	43.50	32.87	16.35	1.87	31.45	---	---	Peak
3	260.58	22.23	-23.77	46.00	31.32	19.94	2.32	31.35	---	---	Peak
4	864.20	32.62	-13.38	46.00	30.22	28.79	4.17	30.56	---	---	Peak
5	901.30	33.07	-12.93	46.00	30.47	29.02	4.12	30.54	---	---	Peak
6	946.10	33.14	-12.86	46.00	29.49	30.11	4.07	30.53	---	---	Peak

Test Mode :	Mode 1	**Temperature :**	25~27°C
Test Engineer :	Jesse Wang	**Relative Humidity :**	48~50%
Test Distance :	3m	**Polarization :**	Vertical
Function Type :	10.579 MHz Link		



Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) VERTICAL
Project : 6O0503

	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	48.63	30.27	-9.73	40.00	44.86	15.93	1.07	31.59	100	0	Peak
2	143.40	20.26	-23.24	43.50	32.09	17.89	1.78	31.50	---	---	Peak
3	295.95	21.14	-24.86	46.00	30.34	19.76	2.32	31.28	---	---	Peak
4	845.30	31.59	-14.41	46.00	29.44	28.62	4.10	30.57	---	---	Peak
5	913.90	32.70	-13.30	46.00	29.79	29.33	4.12	30.54	---	---	Peak
6	947.50	34.10	-11.90	46.00	30.41	30.15	4.07	30.53	---	---	Peak

3.3. Antenna Requirements

3.3.1 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.

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 FCC rule.

3.3.2 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
AC Power Source	AC POWER	AFC-500W	F104070011	50Hz~60Hz	Dec. 02, 2015	Oct. 19, 2016	Dec. 01, 2016	Conducted (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101131	9kHz~30GHz	Jul. 20, 2016	Oct. 19, 2016	Jul. 19, 2017	Conducted (TH03-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35419&03	30MHz to 1GHz	Jan. 13, 2016	Oct. 19, 2016	Jan. 12, 2017	Radiation (03CH07-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	20Hz ~ 8.4GHz	Nov. 04, 2015	Oct. 19, 2016	Nov. 03, 2016	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Oct. 19, 2016	Sep. 01, 2017	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 18, 2016	Oct. 19, 2016	Mar. 17, 2017	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Feb. 27, 2016	Oct. 19, 2016	Feb. 26, 2017	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Oct. 19, 2016	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Oct. 19, 2016	N/A	Radiation (03CH07-HY)

5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.7**