



RADIO TEST REPORT

Applicant : Philio Technology Corporation
Address : 8F., No.653-2, Zhongzheng Rd., Xinzhuang
Dist., New Taipei City 24257, Taiwan(R.O.C)
Equipment : Z-Wave Door / Window Sensor
Model No. : PSM08
Trade Name : Philio
FCC ID : RHHPSM08

I HEREBY CERTIFY THAT :

The sample was received on Jun. 29, 2016 and the testing was carried out on Jul. 01, 2016 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Ray Chou
Assistant Manager

Tested by:

Spree Yei
Engineer

Laboratory Accreditation:

☒ CerpPASS Technology Corporation Test Laboratory



☐ CerpPASS Technology(SuZhou) Co., Ltd.





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History of this test report

Report No.	Issue Date	Description
TEFC1608223	Sep. 05, 2016	Original



1. Summary of Test Procedure and Test Results

1.1. Applicable Standards

ANSI C63.4: 2014

FCC Rules and Regulations Part 15 Subpart C §15.249

FCC Rule	Description of Test	Result
15.207	Conducted Emission	N/A
15.209 15.249	Radiated Emission	Pass



2. Test Configuration of Equipment under Test

2.1. General Description of EUT

Modulation Type	Z-Wave
Operating Frequency	908.4MHz, 916MHz
Antenna Type/ gain	Monopole Antenna/ 0dBi

2.2. Carrier Frequency of Channels

Channel	Frequency(MHz)	Channel	Frequency(MHz)
*1	908.4	*2	916

Note: Channels remarked “*” are selected to perform test.

2.3. Test Mode and Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- The complete test system included EUT for RF test.

2.4. Description of Test System

The EUT was tested alone. No supporting system during the test.



2.5. General Information of Test

☒	Test Site	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
	FCC	TW1079, TW1061,390316, 228391, 641184
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
☐	Test Site	Cerpass Technology (Suzhou) Co.,Ltd Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666
	FCC	916572, 331395
	IC	7290A-1, 7290A-2
	VCCI	T-343 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test G-227 for radiated disturbance above 1GHz
Frequency Range Investigated:		Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 10,000MHz
Test Distance:		The test distance of radiated emission from antenna to EUT is 3 M.



3. Test Equipment and Ancillaries Used for Tests

Instrument	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI3	100443	2016/03/28	2017/03/27
LISN	Schwarzbeck	NSLK 8127	8127-516	2016/03/11	2017/03/10
LISN	Schwarzbeck	NSLK 8127	8127-740	2015/09/03	2016/09/02
Pulse Limiter	R&S	ESH3-Z2	101934	2016/03/09	2017/03/08
Bilog Antenna	Schwarzbeck	VULB9168	369	2016/03/22	2017/03/21
Active Loop Antenna	EMCO	6507	40855	2016/03/11	2017/03/10
Horn Antenna	EMCO	3115	31601	2015/09/02	2016/09/01
Horn Antenna	EMCO	3116	31589	2016/03/22	2017/03/21
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200207	2016/03/16	2017/03/15
Preamplifier	EM	EM330	060660	2016/03/16	2017/03/15
Preamplifier	Agilent	8449B	3008A01954	2016/03/04	2017/03/03
Preamplifier	MITEQ	AMF-7D-00101 00-30-10P	1860212	2016/03/16	2017/03/15
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2015/11/04	2016/11/03
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2016/03/18	2017/03/17
Spectrum Analyzer	R&S	FSP40	100219	2015/09/01	2016/08/31
BLUETOOTH TESTER	R&S	CBT	101133	2016/03/18	2017/03/17
Attenuator	KEYSIGHT	8491B	MY39250703	2016/03/07	2017/03/06
Rotary Attenuator	Agilent	8494B	MY42154466	2016/03/08	2017/03/07
Rotary Attenuator	Agilent	8495B	MY42146680	2016/03/08	2017/03/07
Temp & Humi chamber	T-MACHINE	TMJ-9712	T-12-040111	2015/09/08	2016/09/07
Series Power Meter	Anritsu	ML2495A	1224005	2016/03/03	2017/03/02
Power Sensor	Anritsu	MA2411B	1207295	2016/03/03	2017/03/02
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A
Software	AUDIX	E3	vct-3a1	N/A	N/A
Software	Keysight	N7607B Signal Studio	v2.0.0.1	N/A	N/A
Software	Keysight	Inservice MonitorUtility	N/A	N/A	N/A



4. Test of Conducted Emission

The EUT is powered from Battery; this test item is not applicable.



5. Test of Radiated Emission

5.1. Test Limit

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 radiated emission limits in § 15.209, whichever is the lesser attenuation.

Frequency (MHz)	Distance	Limit ($\mu\text{V}/\text{m}$)
0.09 ~ 0.490	300m	2400/F(kHz)
0.490 ~ 1.705	30m	24000/ F(kHz)
1.705 ~ 30	30m	30
30 ~ 88	3m	100
88 ~ 216	3m	150
216 ~ 960	3m	200
Above 960	3m	500

Fundamental Frequency:

Fundamental Frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

15.215 Additional provisions to the general radiated emission limitations.:

- (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.



5.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. 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 turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- i. "Cone of radiation" has been considered to be 3dB beamwidth of the measurement antenna.

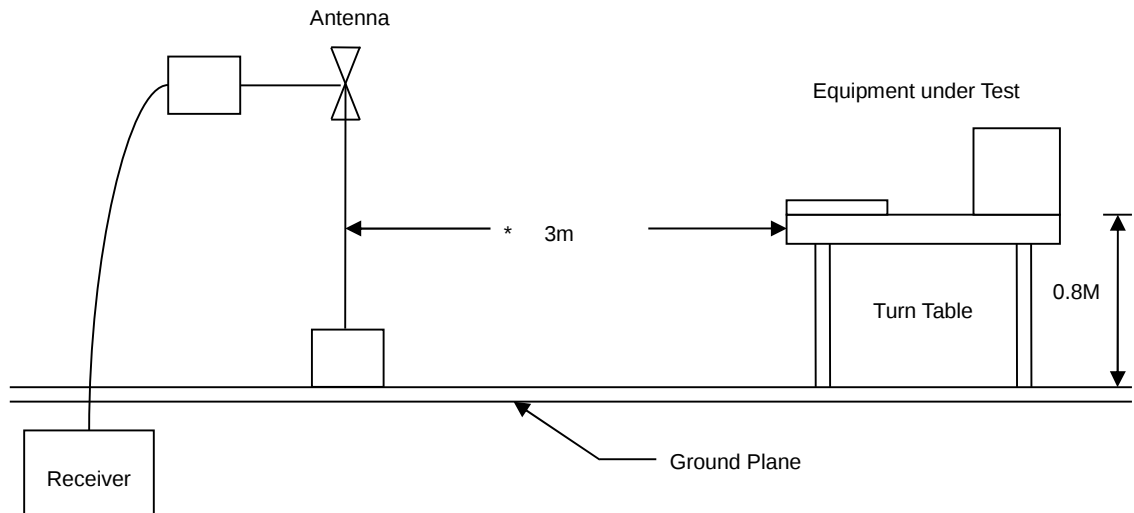
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

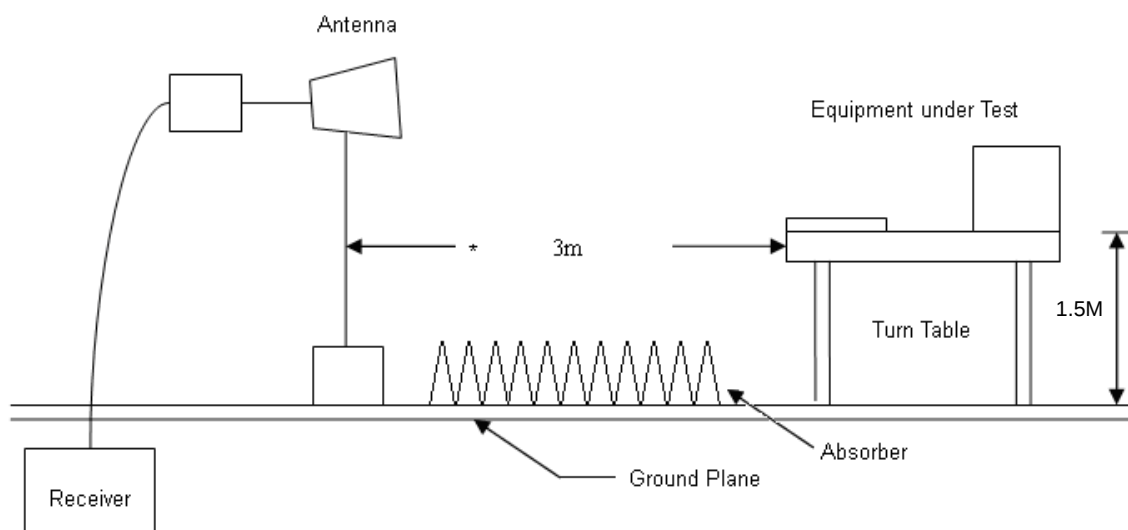


5.3. Typical Test Setup Layout of Radiated Emission

Below 1GHz Test Setup



Above 1GHz Test Setup

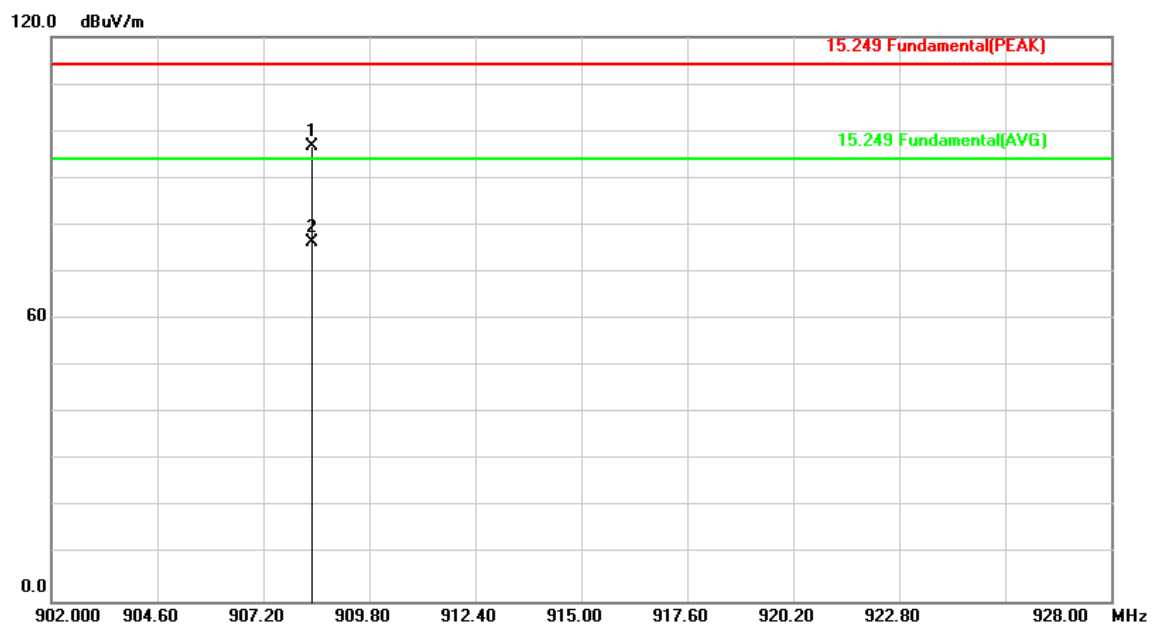




5.4. Test Result and Data

5.4.1. Test Result of Fundamental Emission

Power	: DC 3V	Pol/Phase	: VERTICAL
Test Mode	: TX, 908.4MHz	Temperature	: 26 °C
Test Date	: Jul. 01, 2016	Humidity	: 46 %
Modulation Type	:	Atmospheric Pressure	: 1003 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	908.4000	2.38	94.51	96.89	114.00	-17.11	peak	111	170	P
2	908.4000	2.38	73.90	76.28	94.00	-17.72	AVG	111	170	P

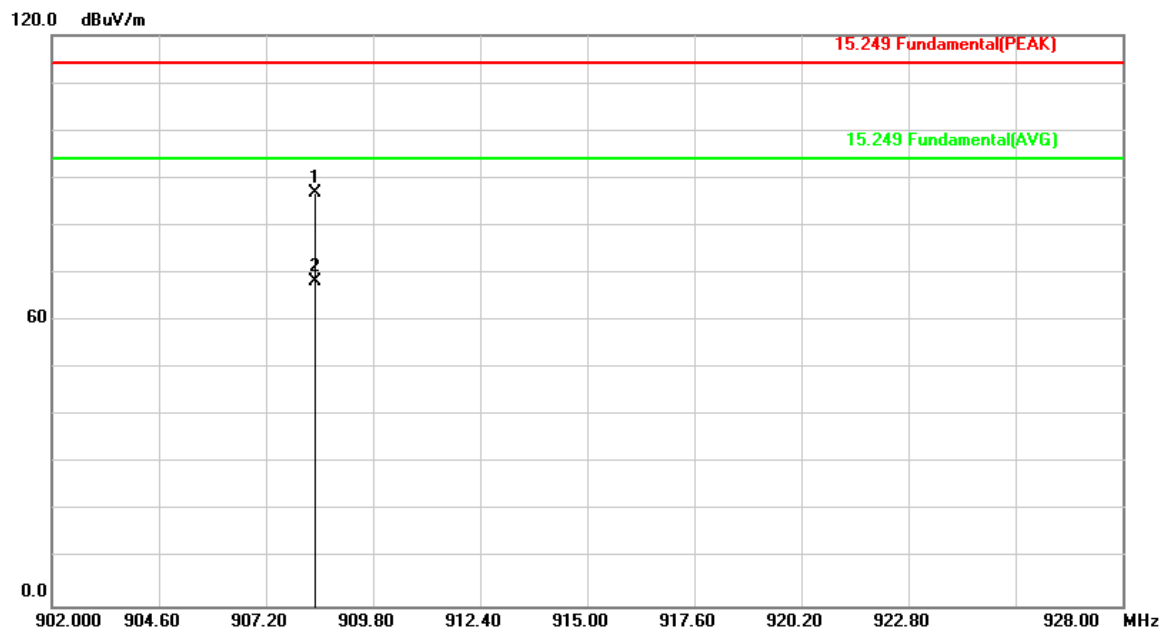
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3V	Pol/Phase	: HORIZONTAL
Test Mode	: TX, 908.4MHz	Temperature	: 26 °C
Test Date	: Jul. 01, 2016	Humidity	: 46 %
Modulation Type	:	Atmospheric Pressure	: 1003 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	908.4000	2.38	84.46	86.84	114.00	-27.16	peak	180	190	P
2	908.4000	2.38	65.85	68.23	94.00	-25.77	AVG	180	190	P

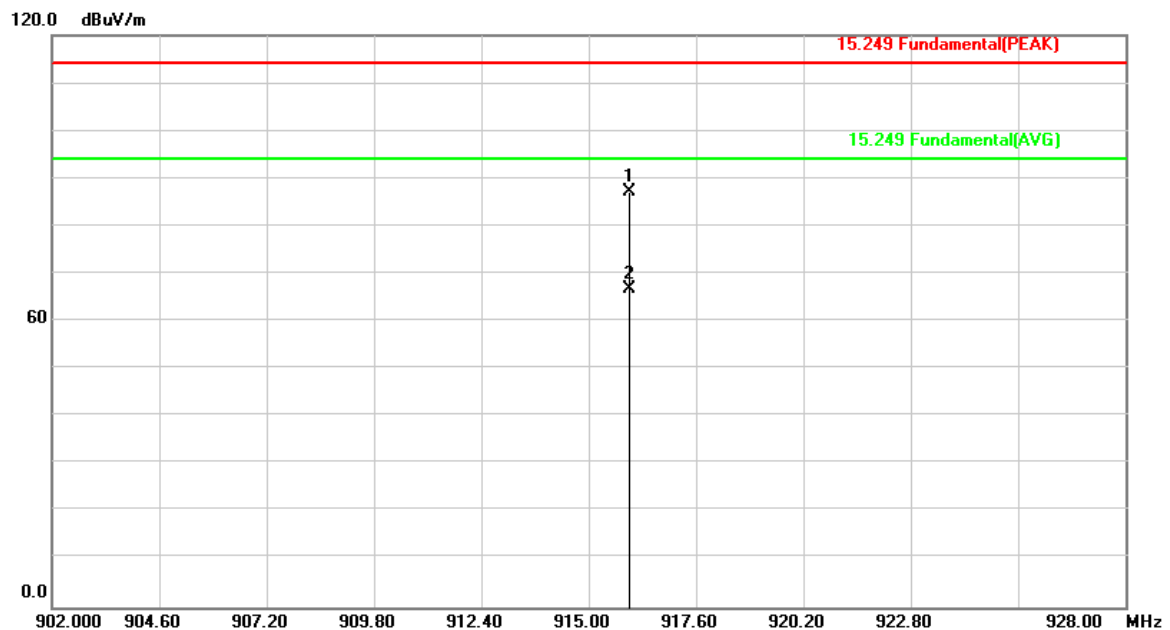
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3V	Pol/Phase	: VERTICAL
Test Mode	: TX, 916MHz	Temperature	: 26 °C
Test Date	: Jul. 01, 2016	Humidity	: 46 %
Modulation Type	:	Atmospheric Pressure	: 1003 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	916.0000	2.51	84.72	87.23	114.00	-26.77	peak	186	202	P
2	916.0000	2.51	64.11	66.62	94.00	-27.38	AVG	186	202	P

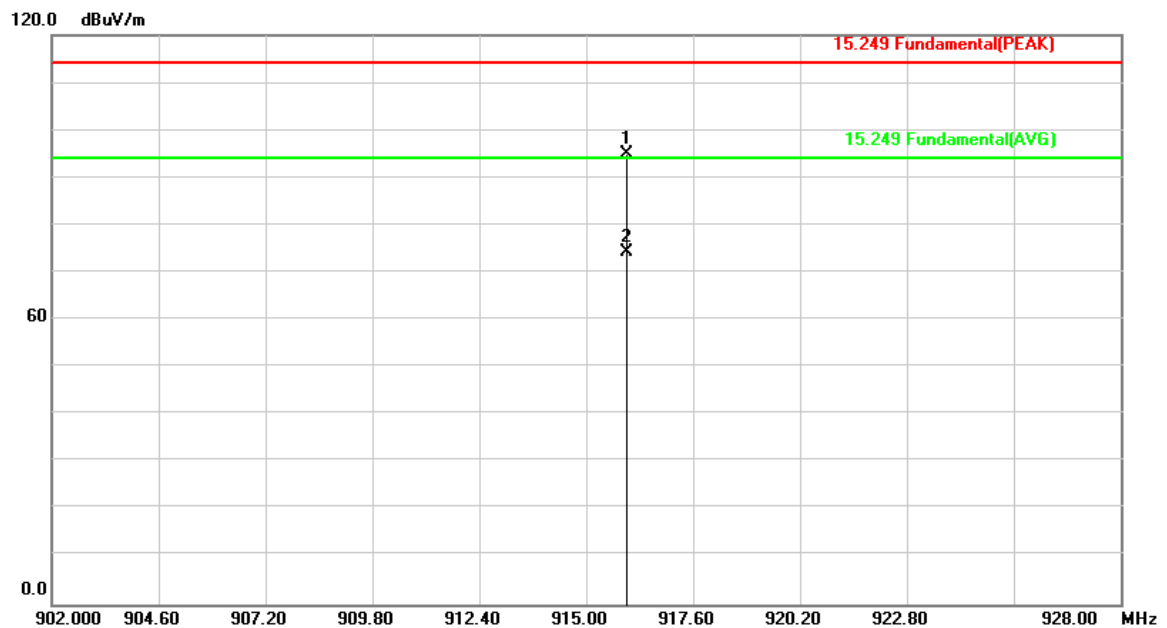
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3V	Pol/Phase	: HORIZONTAL
Test Mode	: TX, 916MHz	Temperature	: 26 °C
Test Date	: Jul. 01, 2016	Humidity	: 46 %
Modulation Type	:	Atmospheric Pressure	: 1003 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	916.0000	2.51	92.39	94.90	114.00	-19.10	peak	100	167	P
2	916.0000	2.51	71.78	74.29	94.00	-19.71	AVG	100	167	P

Note: Level = Reading + Factor

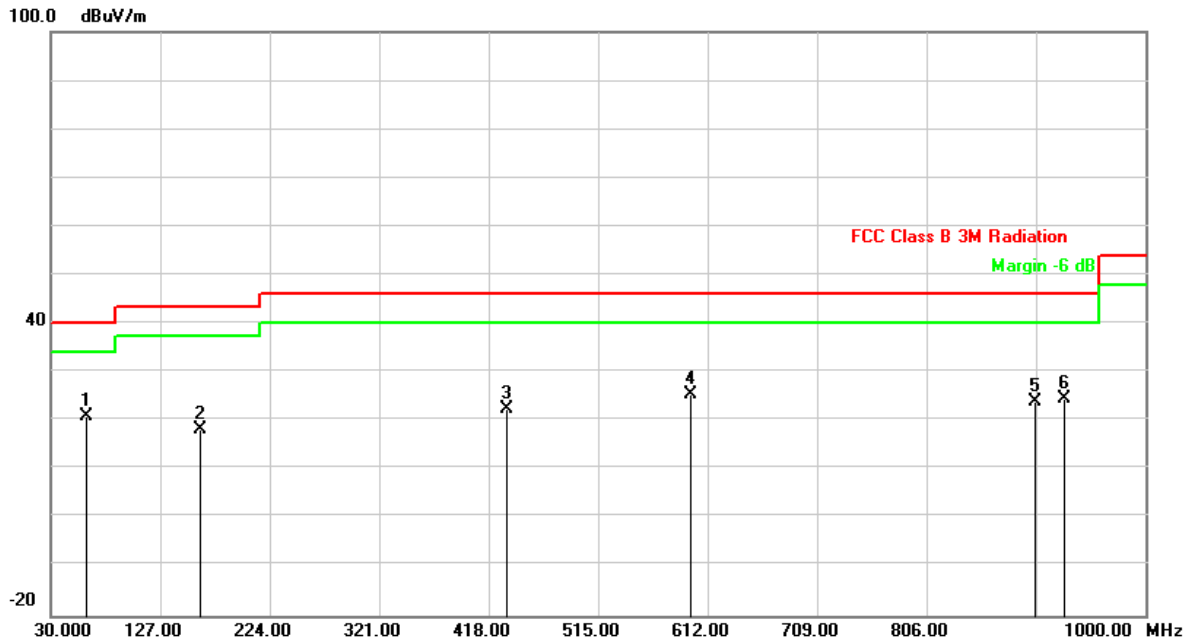
Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



5.4.2. Test Result of Unwanted Spurious emission (30MHz ~ 1GHz)

Power	: DC 3V	Pol/Phase	: VERTICAL
Test Mode	: TX, 908.4MHz	Temperature	: 26 °C
Test Date	: Jul. 01, 2016	Humidity	: 46 %
Memo	:	Atmospheric Pressure	: 1003 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	62.0099	-10.86	31.70	20.84	40.00	-19.16	peak	400	0	P
2	162.8899	-9.99	28.33	18.34	43.50	-25.16	peak	400	0	P
3	434.4900	-5.38	27.93	22.55	46.00	-23.45	peak	400	0	P
4	596.4800	-2.07	27.54	25.47	46.00	-20.53	peak	400	0	P
5	902.0000	2.26	21.64	23.90	46.00	-22.10	QP	180	190	P
6	928.0000	2.72	21.88	24.60	46.00	-21.40	QP	180	190	P

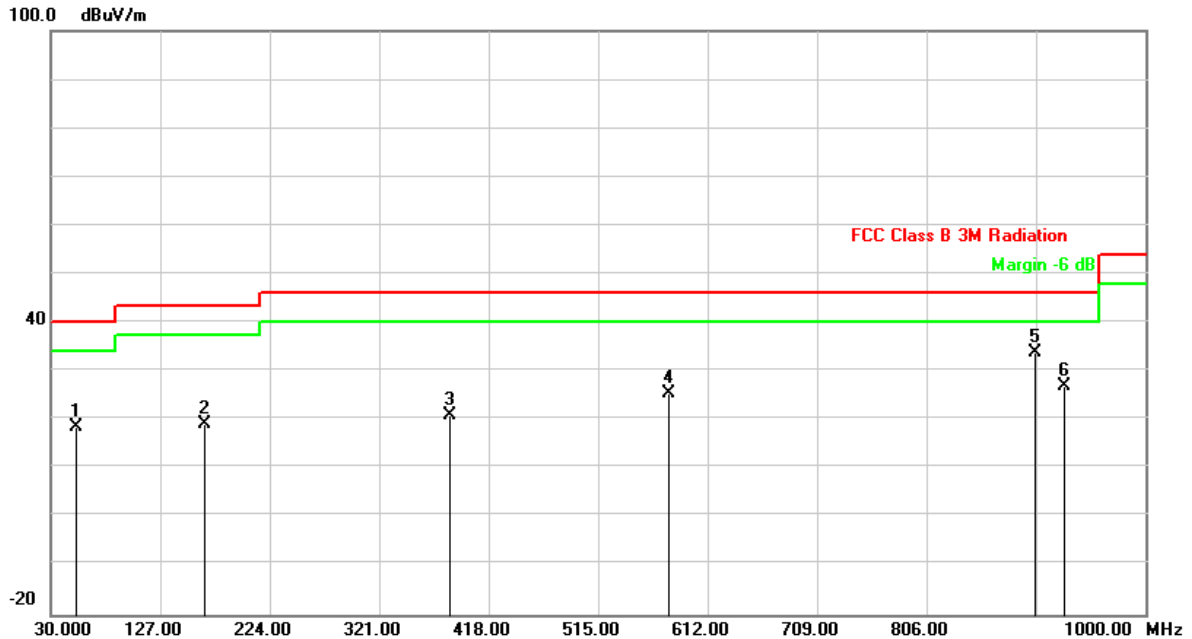
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3V	Pol/Phase	: HORIZONTAL
Test Mode	: TX, 908.4MHz	Temperature	: 26 °C
Test Date	: Jul. 01, 2016	Humidity	: 46 %
Memo	:	Atmospheric Pressure	: 1003 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	52.3100	-9.90	28.49	18.59	40.00	-21.41	peak	100	0	P
2	165.8000	-10.08	29.10	19.02	43.50	-24.48	peak	100	0	P
3	384.0500	-6.83	27.65	20.82	46.00	-25.18	peak	100	0	P
4	578.0498	-2.55	28.10	25.55	46.00	-20.45	peak	100	0	P
5	902.0000	2.26	31.44	33.70	46.00	-12.30	QP	111	170	P
6	928.0000	2.72	24.33	27.05	46.00	-18.95	QP	111	170	P

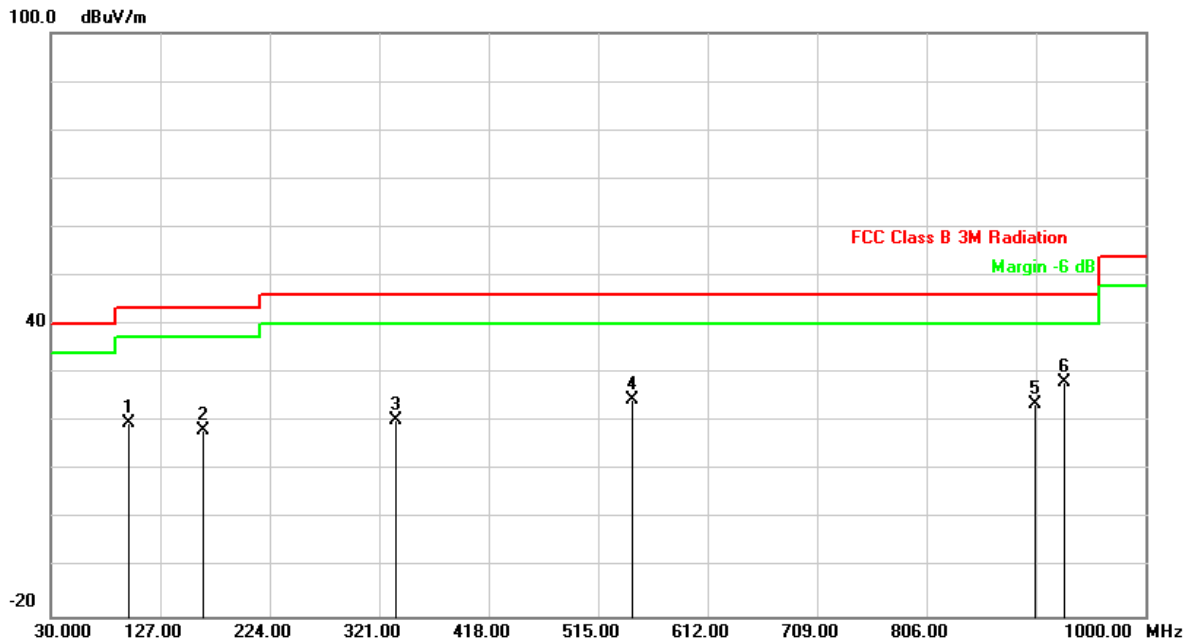
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3V	Pol/Phase	: VERTICAL
Test Mode	: TX, 916MHz	Temperature	: 26 °C
Test Date	: Jul. 01, 2016	Humidity	: 46 %
Memo	:	Atmospheric Pressure	: 1003 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	99.8399	-14.88	34.78	19.90	43.50	-23.60	peak	400	0	P
2	164.8300	-10.05	28.28	18.23	43.50	-25.27	peak	400	0	P
3	336.5199	-8.11	28.39	20.28	46.00	-25.72	peak	400	0	P
4	546.0398	-3.37	28.02	24.65	46.00	-21.35	peak	400	0	P
5	902.0000	2.26	21.34	23.60	46.00	-22.40	QP	186	202	P
6	928.0000	2.72	25.31	28.03	46.00	-17.97	QP	186	202	P

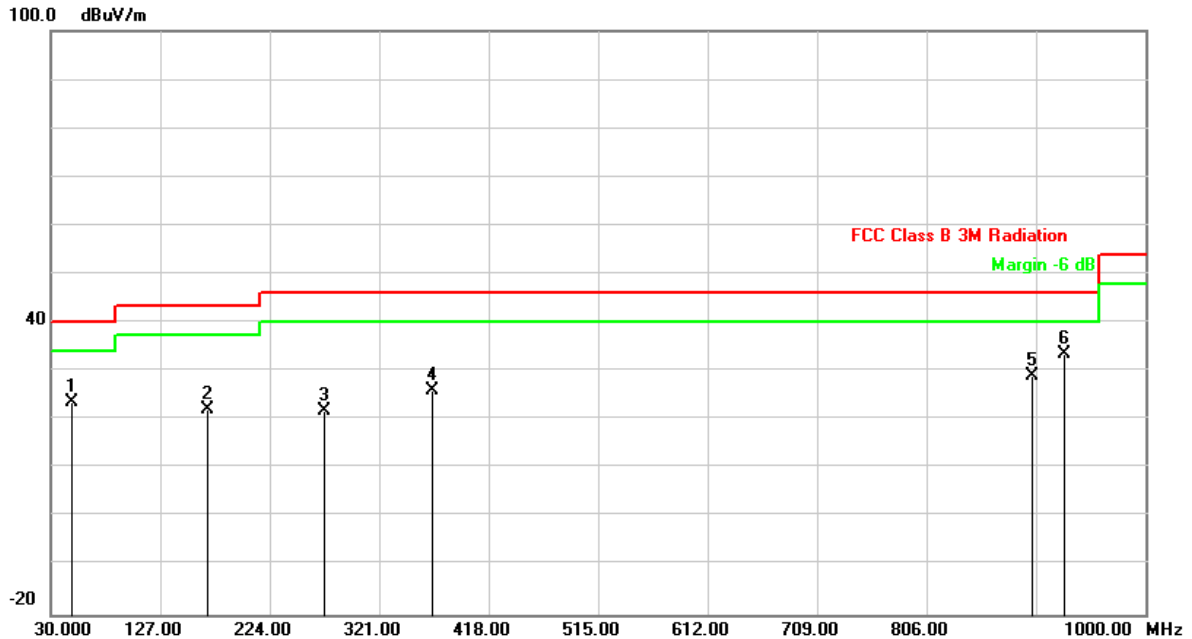
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3V	Pol/Phase	: HORIZONTAL
Test Mode	: TX, 916MHz	Temperature	: 26 °C
Test Date	: Jul. 01, 2016	Humidity	: 46 %
Memo	:	Atmospheric Pressure	: 1003 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	48.4299	-9.73	33.39	23.66	40.00	-16.34	peak	100	0	P
2	168.7100	-10.18	32.37	22.19	43.50	-21.31	peak	100	0	P
3	272.5000	-10.00	31.95	21.95	46.00	-24.05	peak	100	0	P
4	367.5600	-7.28	33.22	25.94	46.00	-20.06	peak	100	0	P
5	899.9500	2.23	26.97	29.20	46.00	-16.80	QP	100	167	P
6	928.0000	2.72	30.88	33.60	46.00	-12.40	QP	100	167	P

Note: Level = Reading + Factor

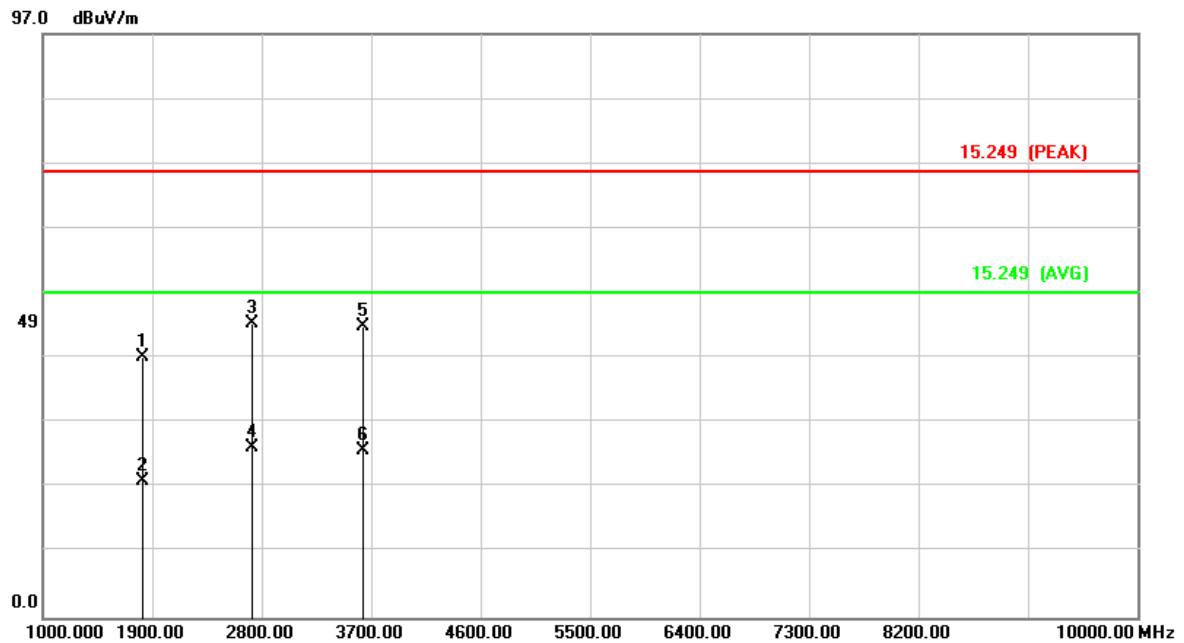
Margin = Level - Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



5.4.3. Test Result of Unwanted Spurious emission (1GHz ~ 10GHz)

Power	: DC 3V	Pol/Phase	: VERTICAL
Test Mode	: TX, 908.4MHz	Temperature	: 25 °C
Test Date	: Jun. 29, 2016	Humidity	: 45 %
Memo	:	Atmospheric Pressure	: 1009 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	1816.800	-3.44	46.66	43.22	74.00	-30.78	peak	122	0	P
2	1816.800	-3.44	26.05	22.61	54.00	-31.39	AVG	122	0	P
3	2725.200	0.55	48.35	48.90	74.00	-25.10	peak	165	160	P
4	2725.200	0.55	27.74	28.29	54.00	-25.71	AVG	165	160	P
5	3633.600	4.45	43.82	48.27	74.00	-25.73	peak	117	180	P
6	3633.600	4.45	23.21	27.66	54.00	-26.34	AVG	117	180	P

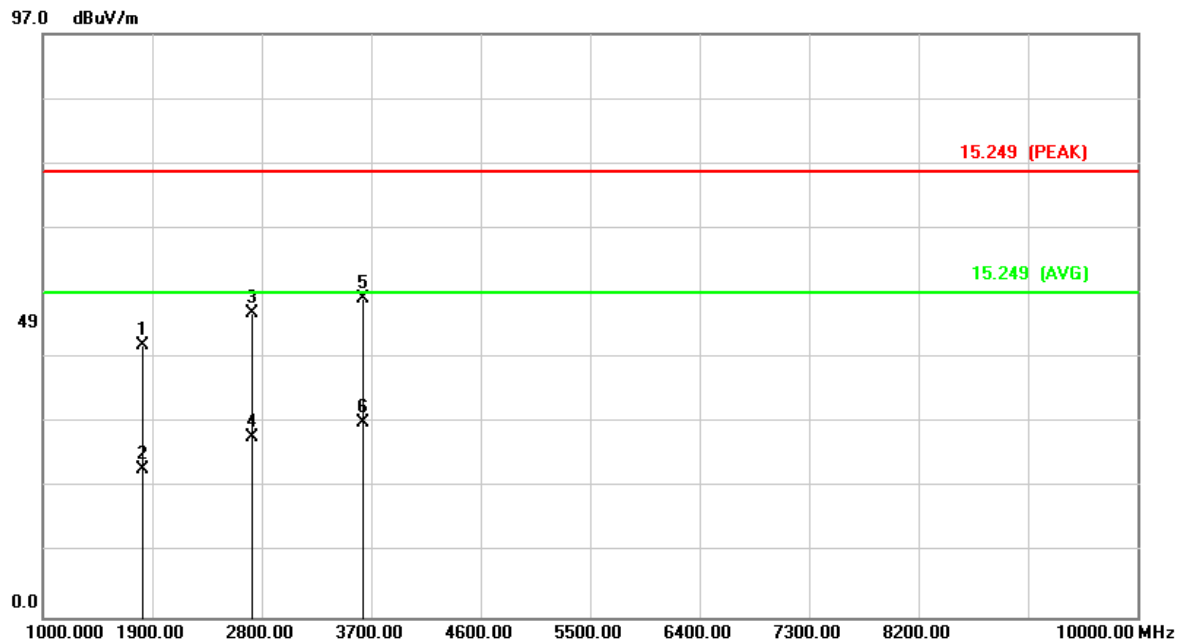
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3V	Pol/Phase	: HORIZONTAL
Test Mode	: TX, 908.4MHz	Temperature	: 25 °C
Test Date	: Jun. 29, 2016	Humidity	: 45 %
Memo	:	Atmospheric Pressure	: 1009 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	1816.800	-3.44	48.61	45.17	74.00	-28.83	peak	100	25	P
2	1816.800	-3.44	28.00	24.56	54.00	-29.44	AVG	100	25	P
3	2725.200	0.55	49.95	50.50	74.00	-23.50	peak	103	178	P
4	2725.200	0.55	29.34	29.89	54.00	-24.11	AVG	103	178	P
5	3633.600	4.45	48.45	52.90	74.00	-21.10	peak	100	306	P
6	3633.600	4.45	27.84	32.29	54.00	-21.71	AVG	100	306	P

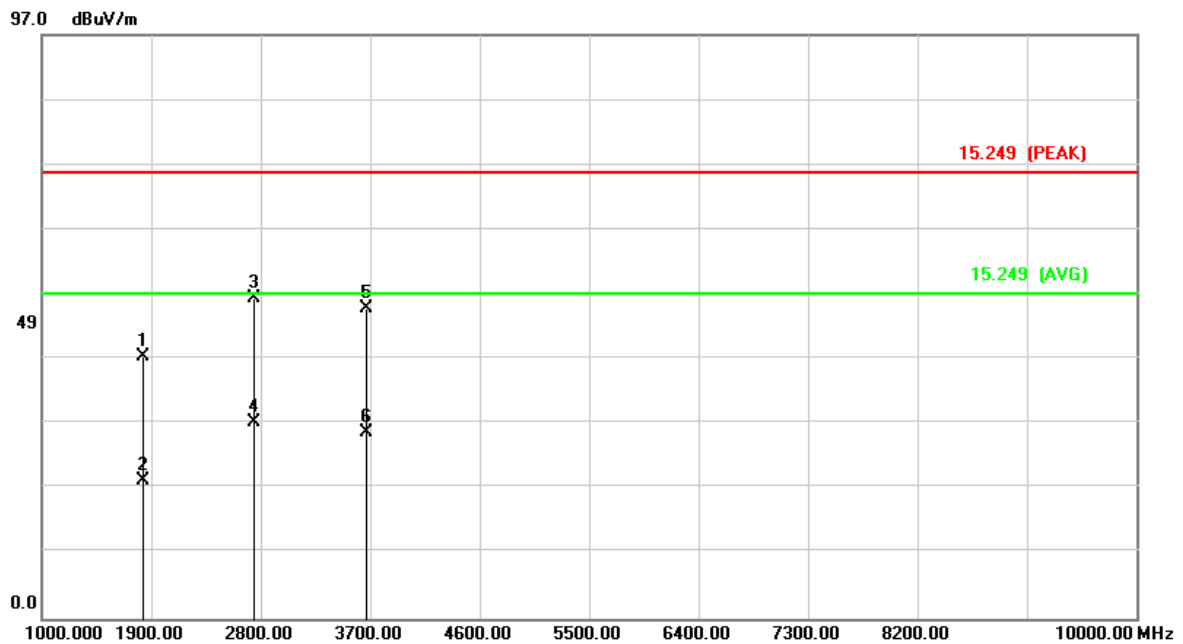
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3V	Pol/Phase	: VERTICAL
Test Mode	: TX, 916MHz	Temperature	: 25 °C
Test Date	: Jun. 29, 2016	Humidity	: 45 %
Memo	:	Atmospheric Pressure	: 1009 hPa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	1832.000	-3.34	46.89	43.55	74.00	-30.45	peak	105	338	P
2	1832.000	-3.34	26.28	22.94	54.00	-31.06	AVG	105	338	P
3	2748.000	0.66	52.49	53.15	74.00	-20.85	peak	192	150	P
4	2748.000	0.66	31.88	32.54	54.00	-21.46	AVG	192	150	P
5	3664.000	4.57	47.07	51.64	74.00	-22.36	peak	158	185	P
6	3664.000	4.57	26.46	31.03	54.00	-22.97	AVG	158	185	P

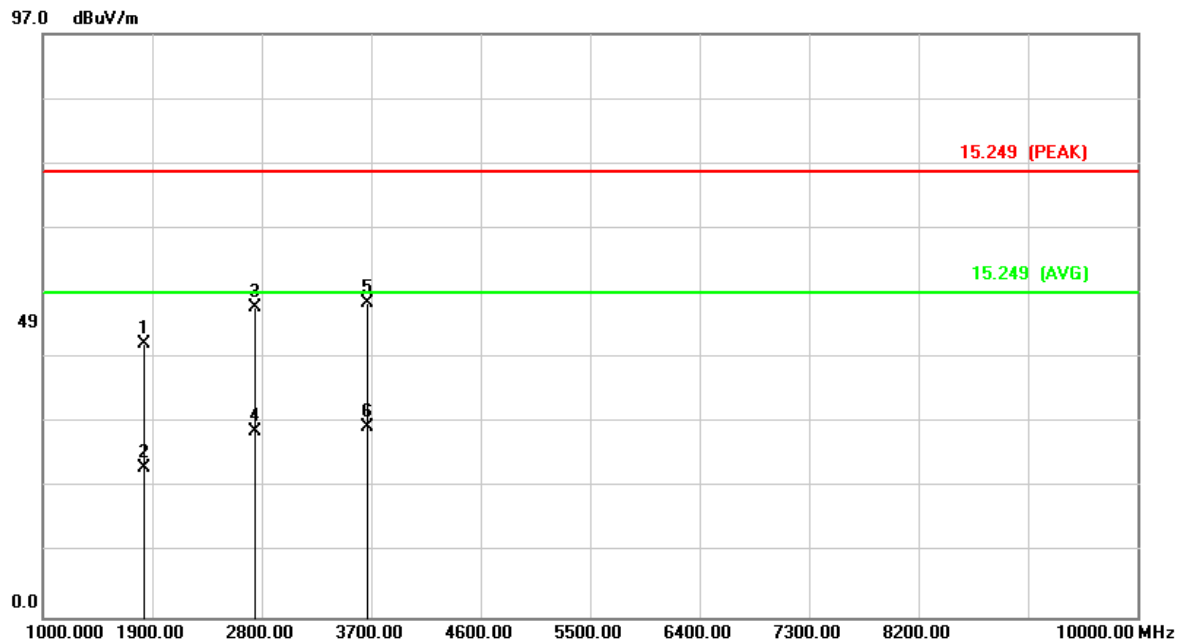
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 3V	Pol/Phase	: HORIZONTAL
Test Mode	: TX, 916MHz	Temperature	: 25 °C
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Memo	:	Atmospheric Pressure	: 1009 hPa

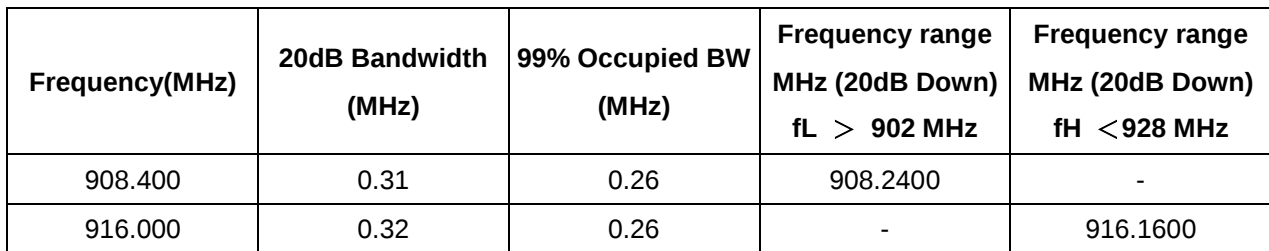


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	1832.000	-3.34	48.77	45.43	74.00	-28.57	peak	183	200	P
2	1832.000	-3.34	28.16	24.82	54.00	-29.18	AVG	183	200	P
3	2748.000	0.66	50.84	51.50	74.00	-22.50	peak	137	170	P
4	2748.000	0.66	30.23	30.89	54.00	-23.11	AVG	137	170	P
5	3664.000	4.57	47.63	52.20	74.00	-21.80	peak	168	52	P
6	3664.000	4.57	27.02	31.59	54.00	-22.41	AVG	168	52	P

Note: Level = Reading + Factor

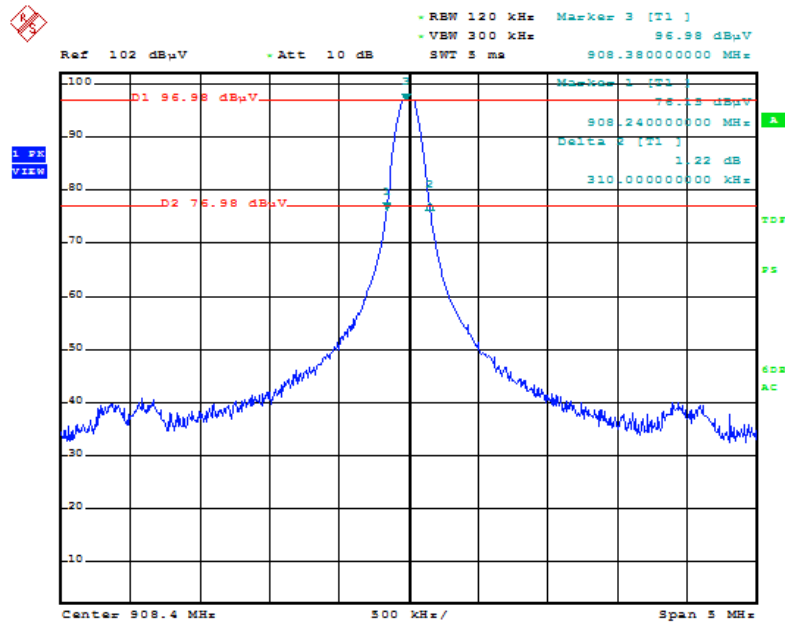
Margin = Level – Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor

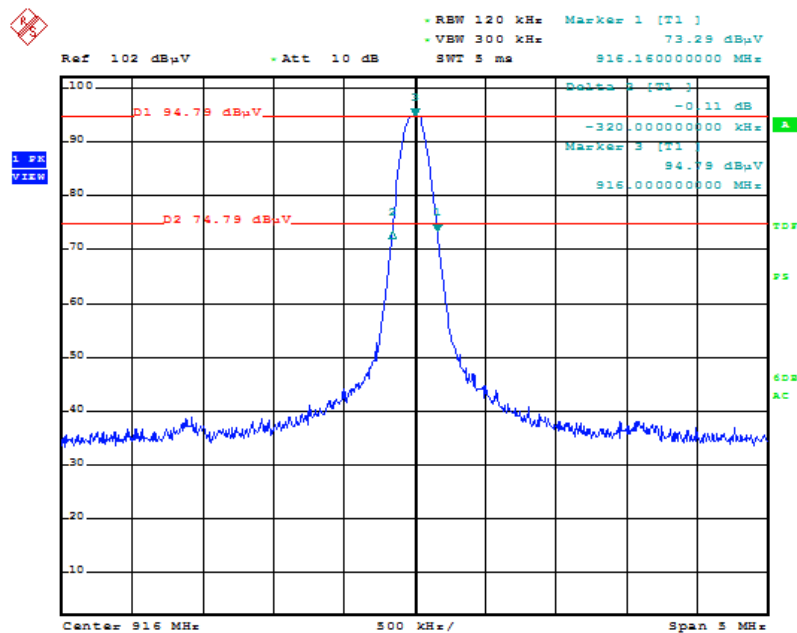


20dB Bandwidth:

908.4 MHz

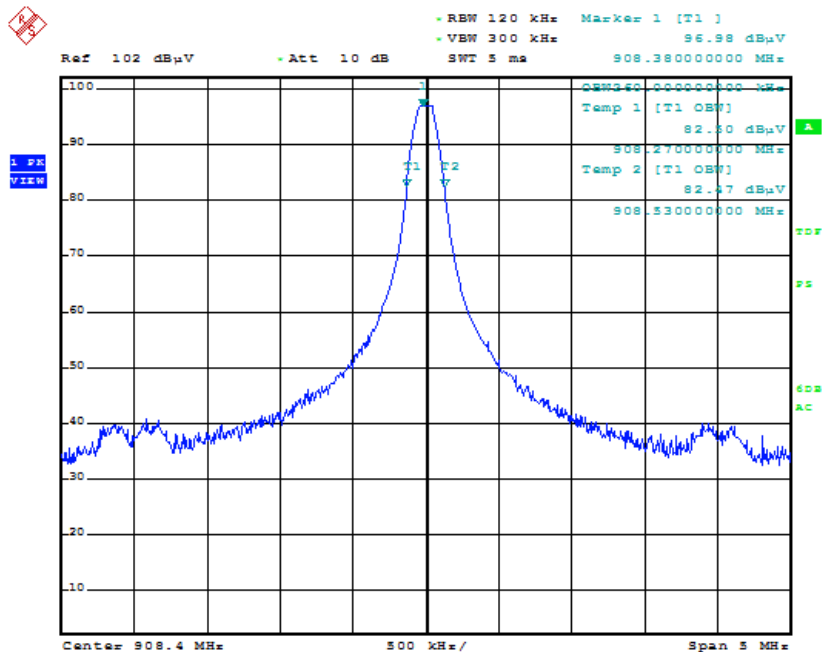


916.0 MHz



**99% Occupied BW:**

908.4 MHz



916.0 MHz

