



FCC RADIO TEST REPORT

FCC ID : QXO-AP3917K
Equipment : Wireless 802.11 a/ac+b/g/n PCBA module
Brand Name : Extreme Networks
Model Name : AP3917k/AP7662k
Applicant : Extreme Networks, Inc.
6480 Via Del Oro San Jose CA 95119 United States
Of America
Manufacturer : Senao Networks, Inc.
3F, No. 529, Chung Cheng Rd. Hsintien Taipei
Taiwan
Standard : 47 CFR FCC Part 90 Subpart Y

The product was received on Sep. 21, 2017, and testing was started from Mar. 22, 2018 and completed on Mar. 23, 2018. We, SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI/TIA-603-D-2010 , 47 CFR FCC Part 90 Subpart Y , ANSI C63.26-2015, KDB971168 D01 Power Meas License Digital Systems v03 and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of This Test Report

Report No.	Version	Description	Issued Date
FL780809-02	01	Initial issue of report	Apr. 10, 2018



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2.1	2.1053/90.210(m)	Transmitter Radiated Unwanted Emissions	PASS	-

Reviewed by: Sam Chen

Report Producer: Wendy Pan

1. General Information

1.1. Product Details

Items	Description
Power Type	From host system
Equipment Category	Fixed Point-to-Multipoint
Product Type	High Power Device
Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Channel Bandwidth	5MHz / 10MHz / 20MHz
Accessories	Antenna SMA cable*4

1.2. Antenna information

Ant.	Type	Model No.	EUT Board Port	Antenna Gain (dBi)	SMA Cable loss (dB)	I-PEX Cable loss (dB)	True Gain (dBi)
2	Omni (Short)	ML-5299-HPA5-01	1	8.25	N/A	0.5	7.75
			2	8.25	N/A	0.5	7.75
3	Omni	CX08OMI136-VC	1	7.2	4.6	1.3	1.3
			2	7.2	4.63	1.3	1.27

**1.3. Table for Carrier Frequencies**

Channel Bandwidth	Carrier Frequency (MHz)
5 MHz	4942.5
	4947.5
	4952.5
	4957.5
	4962.5
	4967.5
	4972.5
	4977.5
	4982.5
	4987.5
10 MHz	4945
	4950
	4955
	4960
	4965
	4970
	4975
	4980
	4985
	4990
20 MHz	4950
	4955
	4960
	4965
	4970
	4975
	4980

1.4. Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases (All modulation modes and different data rates would be evaluated). The following table is a list of the test modes shown in this test report.

Test Items	Channel Bandwidth	Modulation Mode
Transmitter Radiated Unwanted Emissions	5MHz / 10MHz/ 20MHz	QPSK-6Mbps / QPSK-6Mbps

The following test modes were performed for all tests:

The EUT was performed at X axis, Y axis and Z axis position for Radiated emission test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.

For Radiated Emission test:

Mode 1. EUT in Z axis

1.5. Table for Testing Locations

Test Site Location				
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.			
TEL:	886-3-656-9065			
FAX:	886-3-656-9085			
Test Site No.	Site Category	Location	FCC Designation No.	IC File No.
03CH01-CB	SAC	Hsin Chu	TW0006	IC 4086D

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

1.6. Table for Multiple Listing

The EUT has two model names, which are identical to each other in all aspects except for the following table:

Model Name	Description
AP3917k	All the models are identical, the difference model name for difference brand served as marketing strategy.
AP7662k	

From the above models, model: AP3917k was selected as representative model for the test and its data was recorded in this report.



1.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FL780809

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Adding 1 set same type of Omni antenna with lower gain.	Transmitter Radiated Unwanted Emissions

Note: The above test items will be based on original output power to re-test.

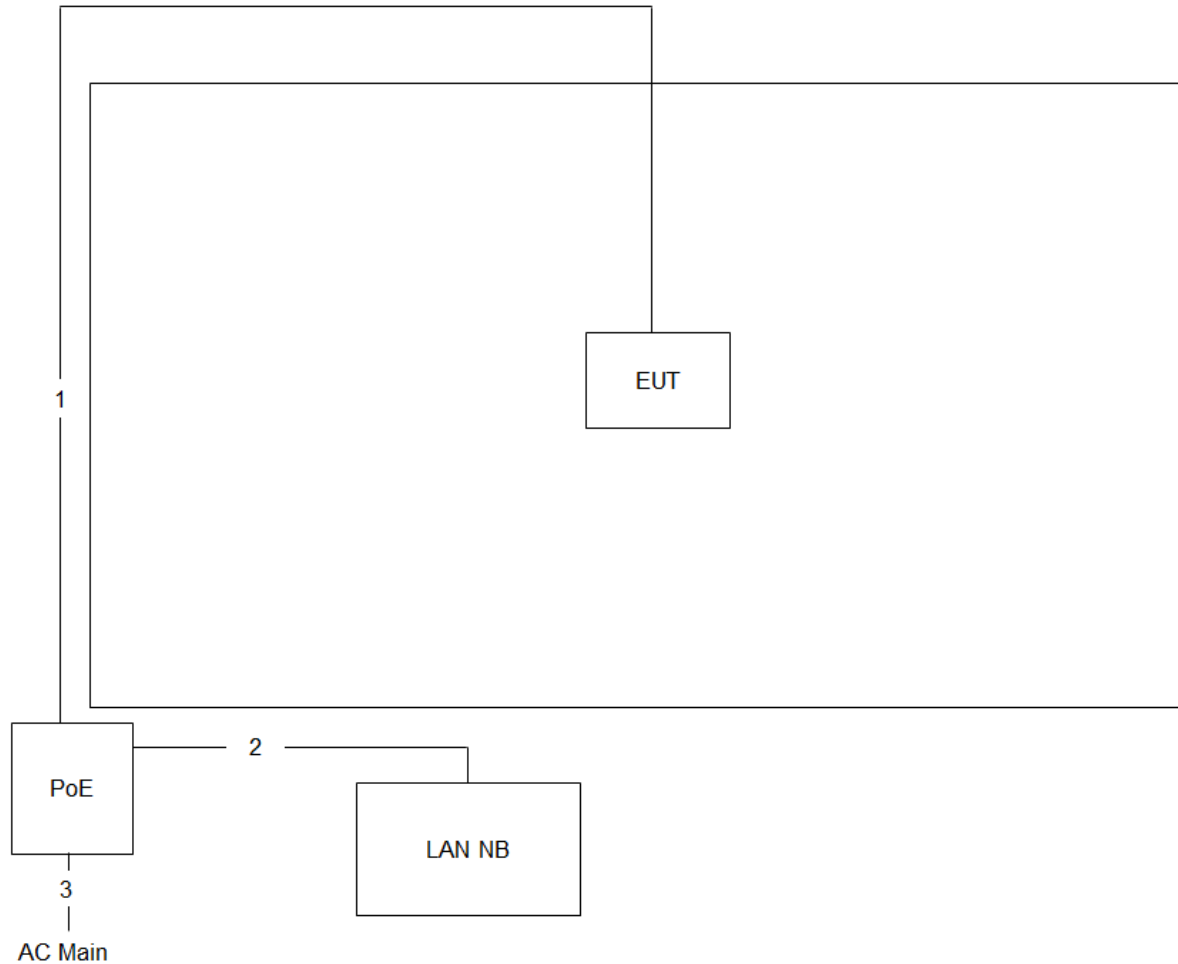
**1.8. Table for Supporting Units**

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC
PoE	EnGenius	EPA5012GP	N/A

1.9. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

1.10. Test Configurations



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	1.5m
3	Power cable	No	0.7m



2. Test Result

2.1. Transmitter Radiated Unwanted Emissions Measurement

2.1.1. Limit

On any frequency removed from the assigned frequency above 150% of the authorized bandwidth: 50 or 55+ 10 log (P) dB, whichever is the lesser attenuation. (P=Average transmit power in watt)

2.1.2. Measuring Instruments and Setting

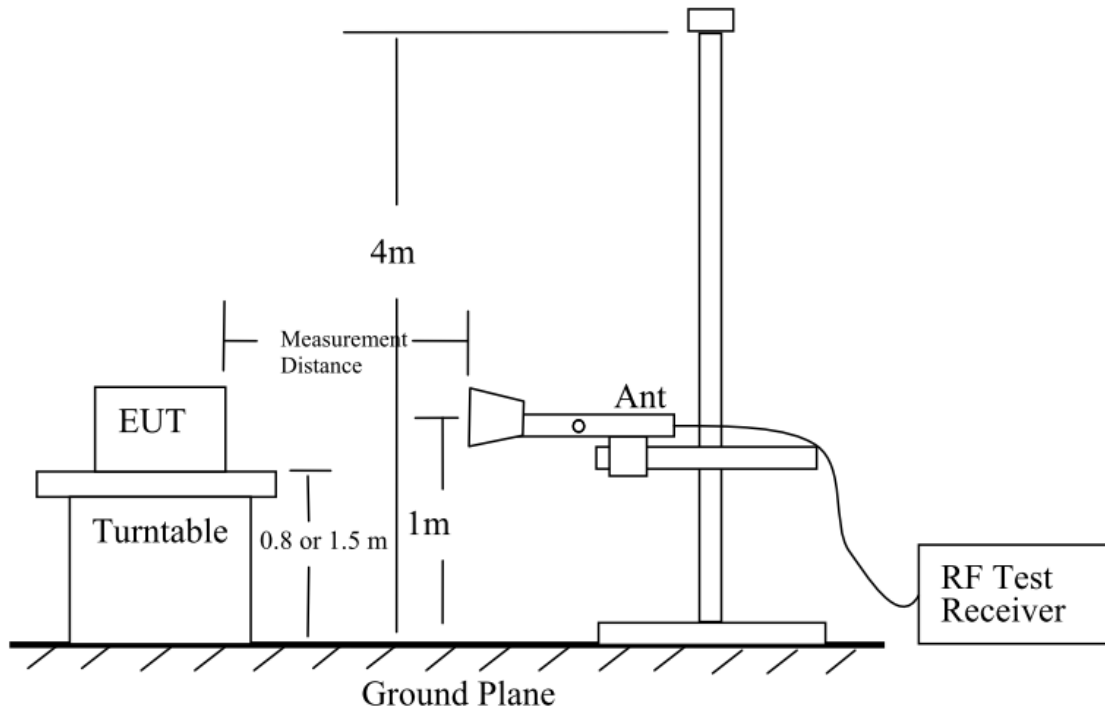
Please refer to section 3 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameter	Setting
Detector	RMS (Average)
Frequency Range	30MHz – 40GHz
RBW / VBW	1 MHz / 3MHz

2.1.3. Test Procedures

1. The EUT was placed on the top of the turntable in anechoic chamber.
2. A spectrum analyzer was used RBW of 1 MHz and VBW of 3 MHz for the final measurements utilizing an RMS detector at the frequencies with spurious emissions amplitudes.
3. 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 *spurious emissions reading*.
4. *Spurious emissions field strength level* equal to *spurious emissions reading on spectrum analyzer*+ *Corrected Reading* (Antenna Factor + Cable Loss - Preamp Factor).
5. Final *radiated spurious emissions* may be converted from *spurious emissions field strength level* - 95.2 dB

2.1.4. Test Setup Layout

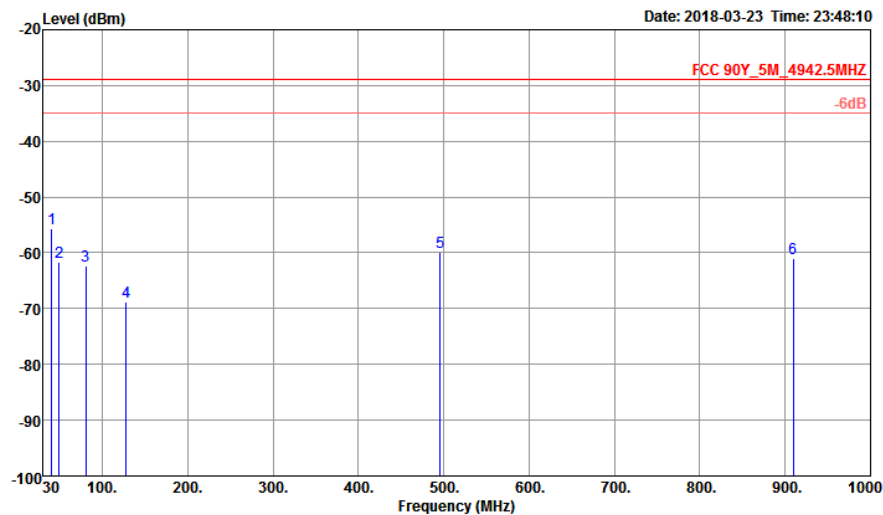


2.1.5. Test Deviation

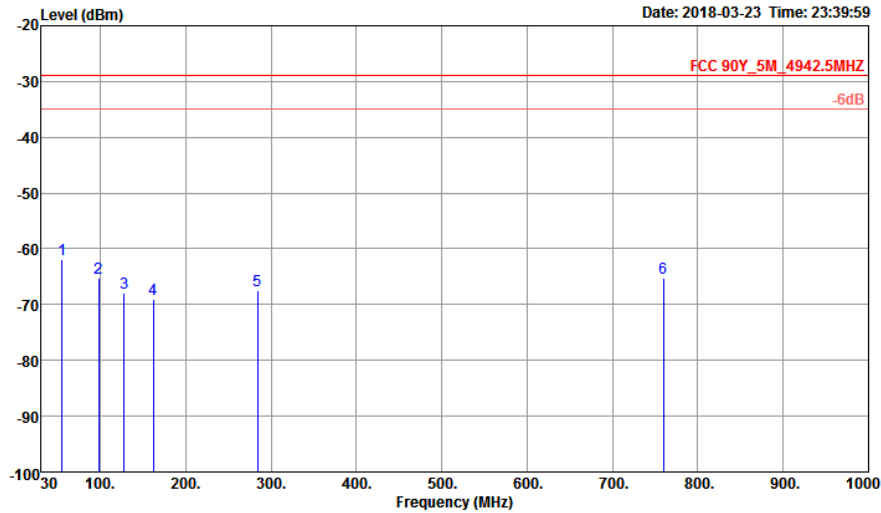
There is no deviation with the original standard.

**2.1.6. Results of Transmitter Radiated Unwanted Emissions (30MHz~1GHz)**

Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	5MHz / 4942.5MHz

Horizontal

	Freq	Level	Over	Limit	Read		A/Pos	T/Pos		
	MHz	dBm	Limit	Line	Level	Factor			Remark	Pol/Phase
			dB	dBm	dBm	dB	cm	deg		
1	40.67	-55.63	-26.63	-29.00	-69.78	14.15	100	324	Peak	HORIZONTAL
2	49.40	-61.62	-32.62	-29.00	-66.71	5.09	125	240	Peak	HORIZONTAL
3	80.44	-62.40	-33.40	-29.00	-63.87	1.47	100	165	Peak	HORIZONTAL
4	127.97	-68.88	-39.88	-29.00	-69.71	0.83	125	282	Peak	HORIZONTAL
5	495.60	-59.97	-30.97	-29.00	-74.59	14.62	100	274	Peak	HORIZONTAL
6	909.79	-61.11	-32.11	-29.00	-76.18	15.07	125	165	Peak	HORIZONTAL

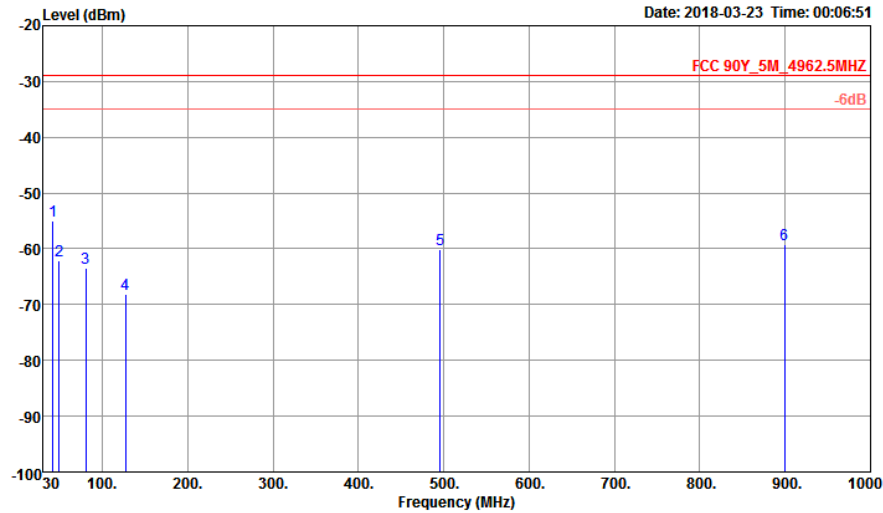
**Vertical**

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	55.22	-61.90	-32.90	-29.00	-53.38	-8.52	100	256	Peak	VERTICAL
2	97.90	-65.15	-36.15	-29.00	-63.01	-2.14	125	127	Peak	VERTICAL
3	127.97	-67.92	-38.92	-29.00	-66.72	-1.20	100	241	Peak	VERTICAL
4	161.92	-69.12	-40.12	-29.00	-67.22	-1.90	100	198	Peak	VERTICAL
5	284.14	-67.49	-38.49	-29.00	-74.11	6.62	125	166	Peak	VERTICAL
6	759.44	-65.21	-36.21	-29.00	-74.95	9.74	125	35	Peak	VERTICAL

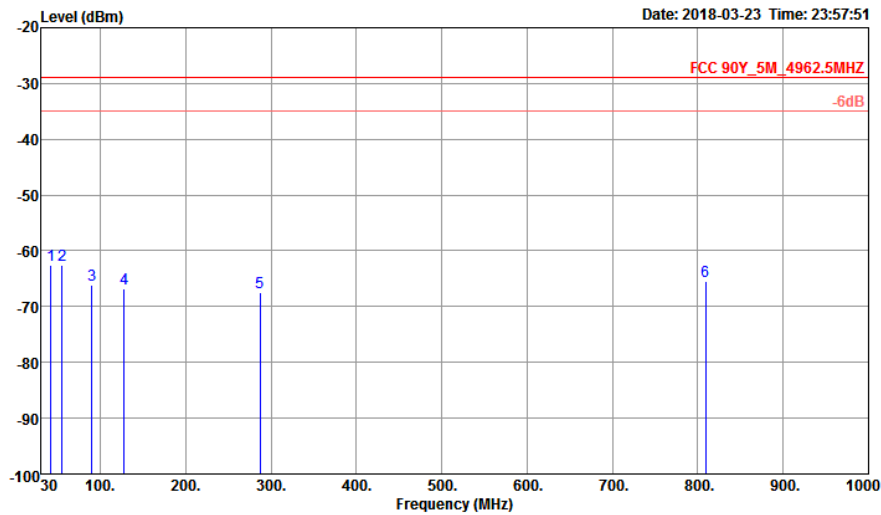


Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	5MHz / 4962.5MHz

Horizontal



	Freq	Level	Over	Limit	Read	A/Pos	T/Pos			
	MHz	dBm	Limit	Line	Level	Factor			Remark	Pol/Phase
			dB	dBm	dBm	dB	cm	deg		
1	41.64	-54.88	-25.90	-28.98	-68.13	13.25	100	262	Peak	HORIZONTAL
2	49.40	-62.04	-33.06	-28.98	-67.13	5.09	125	354	Peak	HORIZONTAL
3	80.44	-63.51	-34.53	-28.98	-64.98	1.47	100	264	Peak	HORIZONTAL
4	127.00	-68.22	-39.24	-28.98	-69.06	0.84	125	135	Peak	HORIZONTAL
5	495.60	-60.07	-31.09	-28.98	-74.69	14.62	100	281	Peak	HORIZONTAL
6	899.12	-59.13	-30.15	-28.98	-74.84	15.71	100	65	Peak	HORIZONTAL

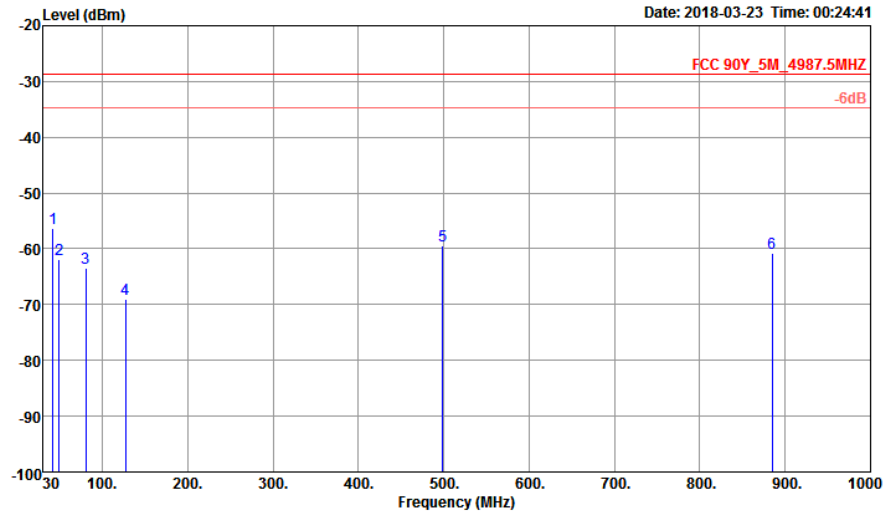
**Vertical**

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	41.64	-62.63	-33.65	-28.98	-54.46	-8.17	100	5	Peak	VERTICAL
2	55.22	-62.58	-33.60	-28.98	-54.06	-8.52	125	294	Peak	VERTICAL
3	90.14	-66.19	-37.21	-28.98	-64.05	-2.14	100	126	Peak	VERTICAL
4	127.97	-66.86	-37.88	-28.98	-65.66	-1.20	125	99	Peak	VERTICAL
5	287.05	-67.55	-38.57	-28.98	-74.26	6.71	125	45	Peak	VERTICAL
6	808.91	-65.39	-36.41	-28.98	-75.09	9.70	100	306	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	5MHz / 4987.5MHz

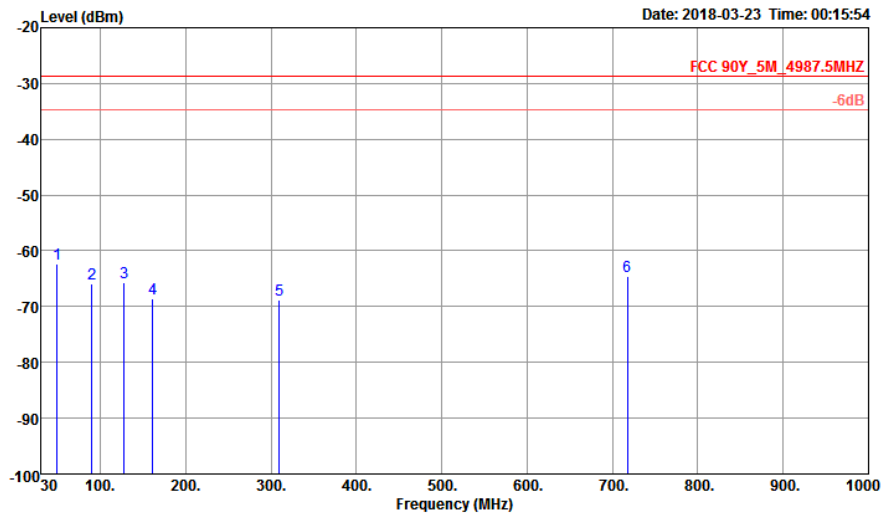
Horizontal



	Freq	Level	Over	Limit	Read		A/Pos	T/Pos		
	MHz	dBm	Limit	Line	Level	Factor			Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	41.64	-56.41	-27.71	-28.70	-69.66	13.25	125	300	Peak	HORIZONTAL
2	49.40	-61.97	-33.27	-28.70	-67.06	5.09	100	275	Peak	HORIZONTAL
3	80.44	-63.56	-34.86	-28.70	-65.03	1.47	100	269	Peak	HORIZONTAL
4	127.00	-68.96	-40.26	-28.70	-69.80	0.84	100	138	Peak	HORIZONTAL
5	498.51	-59.52	-30.82	-28.70	-74.30	14.78	100	298	Peak	HORIZONTAL
6	884.57	-60.76	-32.06	-28.70	-75.29	14.53	100	78	Peak	HORIZONTAL



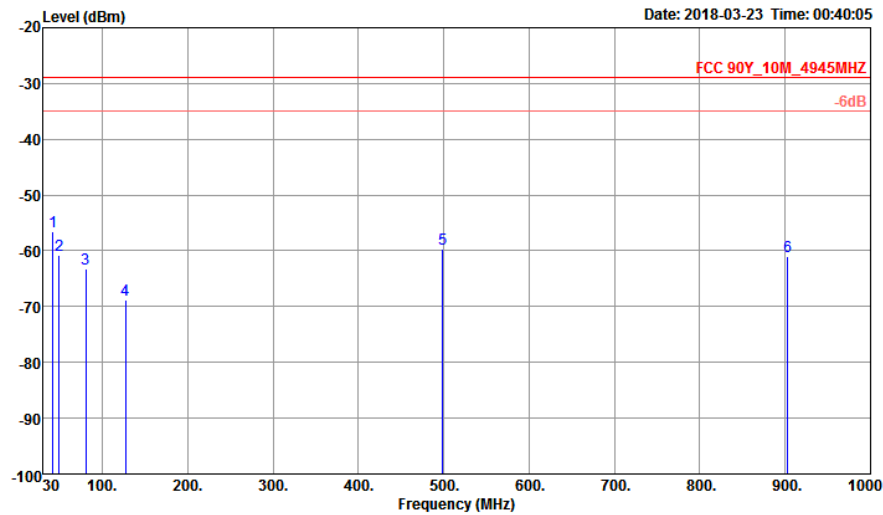
Vertical



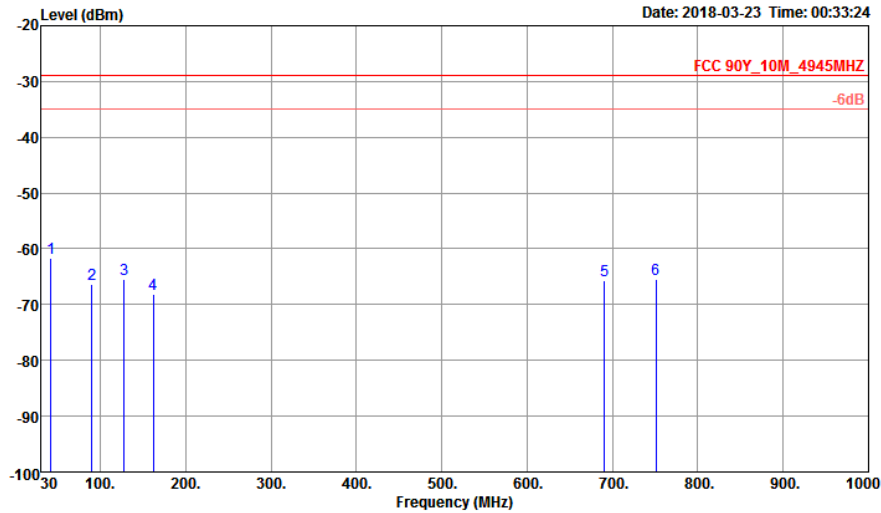
	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	49.40	-62.24	-33.54	-28.70	-53.64	-8.60	125	48	Peak	VERTICAL
2	90.14	-66.01	-37.31	-28.70	-63.87	-2.14	100	164	Peak	VERTICAL
3	127.97	-65.63	-36.93	-28.70	-64.43	-1.20	125	65	Peak	VERTICAL
4	160.95	-68.53	-39.83	-28.70	-66.54	-1.99	100	333	Peak	VERTICAL
5	309.36	-68.81	-40.11	-28.70	-75.54	6.73	150	228	Peak	VERTICAL
6	717.73	-64.49	-35.79	-28.70	-74.06	9.57	100	122	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	10MHz / 4945MHz

Horizontal

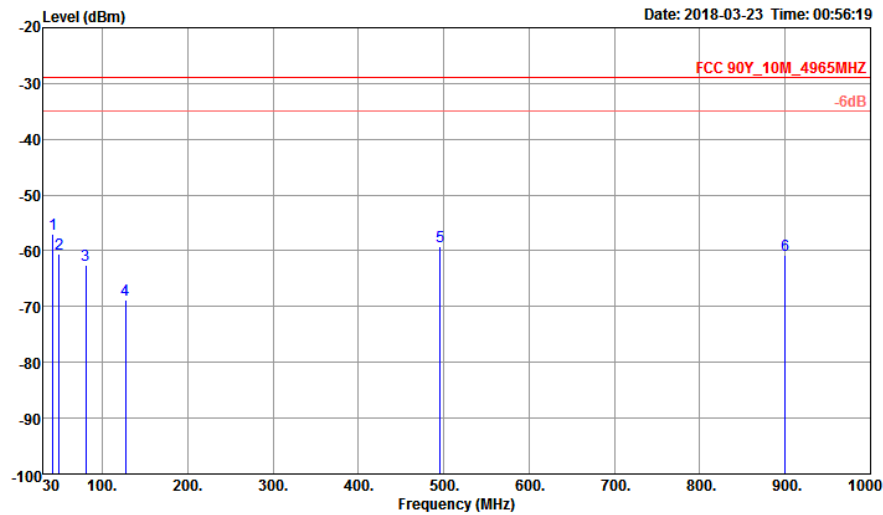
	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	41.64	-56.53	-27.62	-28.91	-69.78	13.25	100	222	Peak	HORIZONTAL
2	49.40	-60.72	-31.81	-28.91	-65.81	5.09	100	148	Peak	HORIZONTAL
3	80.44	-63.32	-34.41	-28.91	-64.79	1.47	125	344	Peak	HORIZONTAL
4	127.00	-68.87	-39.96	-28.91	-69.71	0.84	100	156	Peak	HORIZONTAL
5	498.51	-59.56	-30.65	-28.91	-74.34	14.78	100	208	Peak	HORIZONTAL
6	903.00	-61.07	-32.16	-28.91	-76.57	15.50	125	269	Peak	HORIZONTAL

**Vertical**

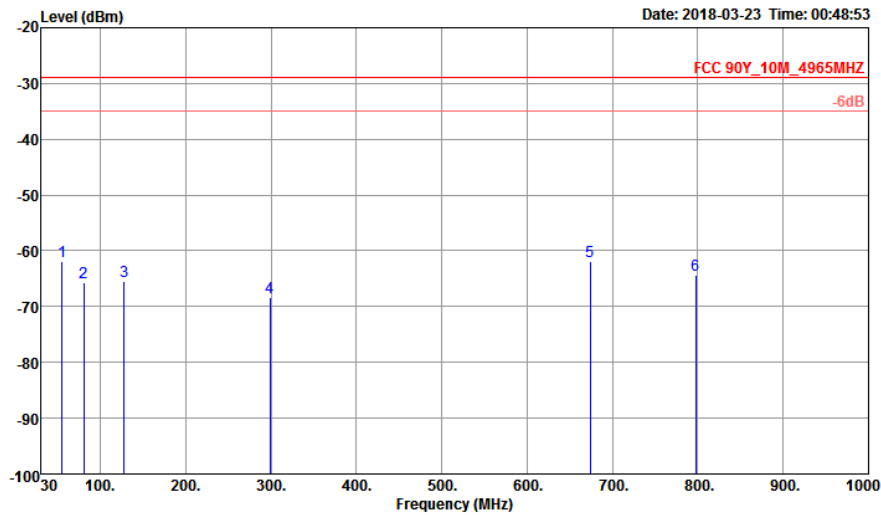
	Freq	Level	Over	Limit	Read		A/Pos	T/Pos		
	MHz	dBm	Limit	Line	Level	Factor			Remark	Pol/Phase
			dB	dBm	dBm	dB	cm	deg		
1	41.64	-61.71	-32.80	-28.91	-53.54	-8.17	125	301	Peak	VERTICAL
2	90.14	-66.32	-37.41	-28.91	-64.18	-2.14	100	61	Peak	VERTICAL
3	127.97	-65.57	-36.66	-28.91	-64.37	-1.20	100	22	Peak	VERTICAL
4	161.92	-68.07	-39.16	-28.91	-66.17	-1.90	125	348	Peak	VERTICAL
5	690.57	-65.64	-36.73	-28.91	-74.84	9.20	100	247	Peak	VERTICAL
6	750.71	-65.56	-36.65	-28.91	-75.26	9.70	100	38	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	10MHz / 4965MHz

Horizontal

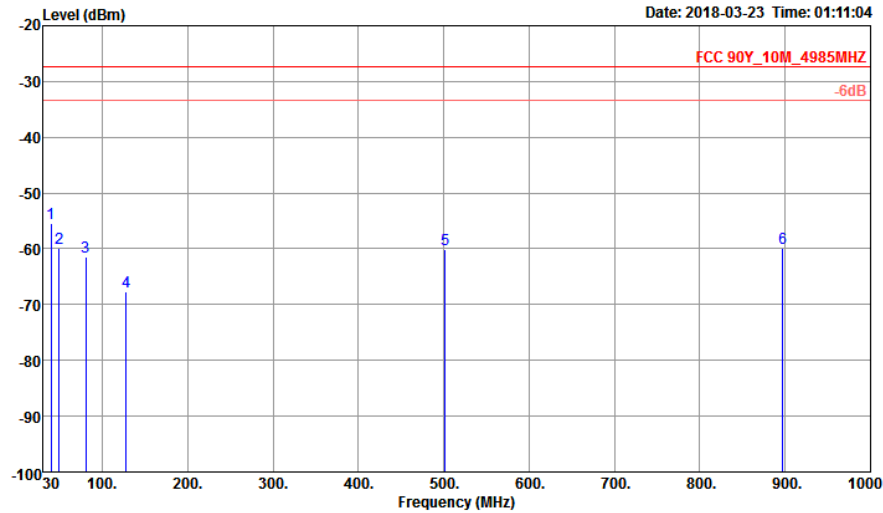
	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	41.64	-56.94	-28.04	-28.90	-70.19	13.25	100	106	Peak	HORIZONTAL
2	49.40	-60.50	-31.60	-28.90	-65.59	5.09	125	54	Peak	HORIZONTAL
3	80.44	-62.59	-33.69	-28.90	-64.06	1.47	100	126	Peak	HORIZONTAL
4	127.00	-68.89	-39.99	-28.90	-69.73	0.84	100	248	Peak	HORIZONTAL
5	495.60	-59.22	-30.32	-28.90	-73.84	14.62	125	197	Peak	HORIZONTAL
6	900.09	-60.76	-31.86	-28.90	-76.47	15.71	100	145	Peak	HORIZONTAL

**Vertical**

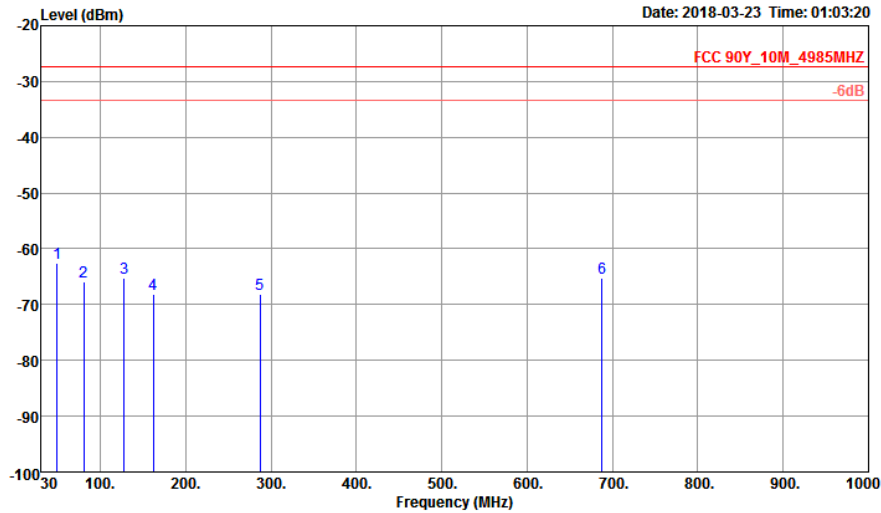
	Freq	Level	Over	Limit	Read		A/Pos	T/Pos		
	MHz	dBm	Limit	Line	Level	Factor			Remark	Pol/Phase
			dB	dBm	dBm	dB	cm	deg		
1	55.22	-62.01	-33.11	-28.90	-53.49	-8.52	100	64	Peak	VERTICAL
2	80.44	-65.61	-36.71	-28.90	-60.61	-5.00	125	120	Peak	VERTICAL
3	127.97	-65.55	-36.65	-28.90	-64.35	-1.20	100	301	Peak	VERTICAL
4	298.69	-68.32	-39.42	-28.90	-75.34	7.02	100	200	Peak	VERTICAL
5	674.08	-61.79	-32.89	-28.90	-70.55	8.76	150	85	Peak	VERTICAL
6	797.27	-64.42	-35.52	-28.90	-74.29	9.87	100	231	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Cola Fan	Mode	10MHz / 4985MHz

Horizontal

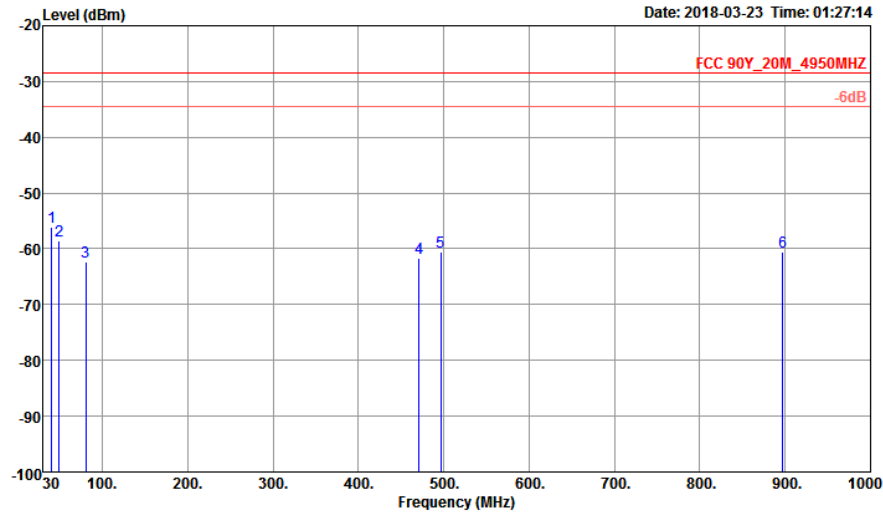
	Freq	Level	Over	Limit	Read		A/Pos	T/Pos		
	MHz	dBm	Limit	Line	Level	Factor			Remark	Pol/Phase
			dB	dBm	dBm	dB	cm	deg		
1	39.70	-55.53	-28.17	-27.36	-70.22	14.69	100	146	Peak	HORIZONTAL
2	49.40	-59.86	-32.50	-27.36	-64.95	5.09	100	275	Peak	HORIZONTAL
3	80.44	-61.49	-34.13	-27.36	-62.96	1.47	125	35	Peak	HORIZONTAL
4	127.97	-67.75	-40.39	-27.36	-68.58	0.83	125	153	Peak	HORIZONTAL
5	501.42	-60.14	-32.78	-27.36	-74.90	14.76	150	298	Peak	HORIZONTAL
6	897.18	-59.85	-32.49	-27.36	-75.32	15.47	100	256	Peak	HORIZONTAL

**Vertical**

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	49.40	-62.61	-35.25	-27.36	-54.01	-8.60	125	54	Peak	VERTICAL
2	80.44	-65.82	-38.46	-27.36	-60.82	-5.00	100	264	Peak	VERTICAL
3	127.97	-65.25	-37.89	-27.36	-64.05	-1.20	100	138	Peak	VERTICAL
4	161.92	-68.12	-40.76	-27.36	-66.22	-1.90	125	296	Peak	VERTICAL
5	287.05	-68.10	-40.74	-27.36	-74.81	6.71	100	25	Peak	VERTICAL
6	687.66	-65.25	-37.89	-27.36	-74.38	9.13	100	351	Peak	VERTICAL



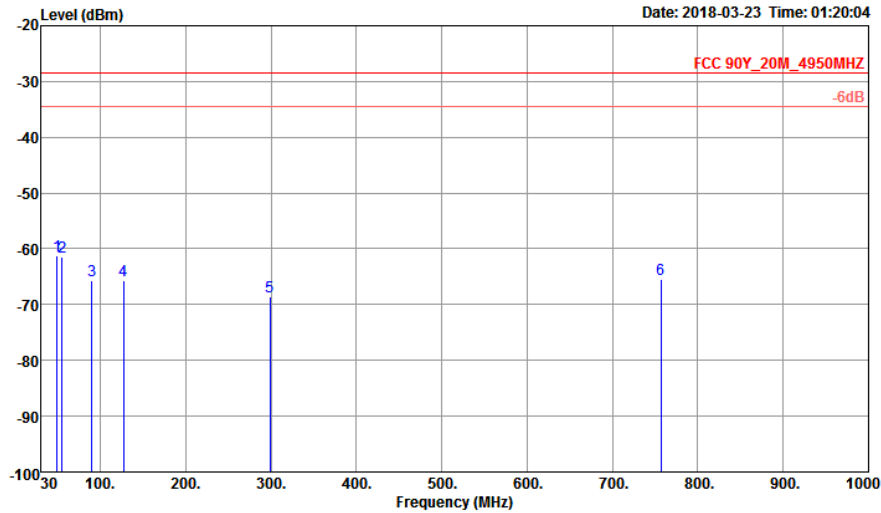
Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	20MHz / 4950MHz

Horizontal

	Freq	Level	Over	Limit	Read		A/Pos	T/Pos		
	MHz	dBm	Limit	Line	Level	Factor			Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	40.67	-56.06	-27.50	-28.56	-70.21	14.15	100	16	Peak	HORIZONTAL
2	49.40	-58.54	-29.98	-28.56	-63.63	5.09	100	238	Peak	HORIZONTAL
3	80.44	-62.44	-33.88	-28.56	-63.91	1.47	125	265	Peak	HORIZONTAL
4	471.35	-61.78	-33.22	-28.56	-74.09	12.31	125	211	Peak	HORIZONTAL
5	496.57	-60.47	-31.91	-28.56	-75.09	14.62	100	58	Peak	HORIZONTAL
6	897.18	-60.52	-31.96	-28.56	-75.99	15.47	100	84	Peak	HORIZONTAL



Vertical

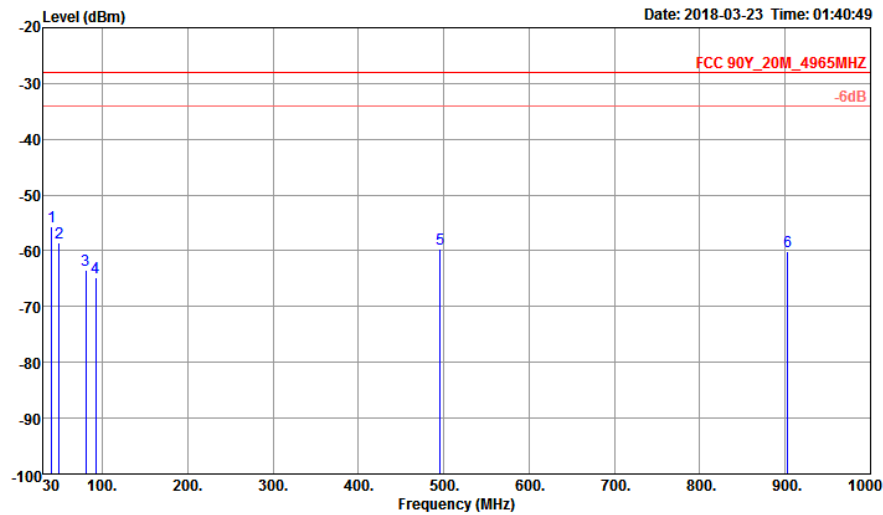


	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	49.40	-61.21	-32.65	-28.56	-52.61	-8.60	100	259	Peak	VERTICAL
2	55.22	-61.39	-32.83	-28.56	-52.87	-8.52	100	132	Peak	VERTICAL
3	90.14	-65.72	-37.16	-28.56	-63.58	-2.14	100	185	Peak	VERTICAL
4	127.00	-65.76	-37.20	-28.56	-64.37	-1.39	100	226	Peak	VERTICAL
5	298.69	-68.54	-39.98	-28.56	-75.56	7.02	100	158	Peak	VERTICAL
6	756.53	-65.42	-36.86	-28.56	-75.14	9.72	125	2	Peak	VERTICAL

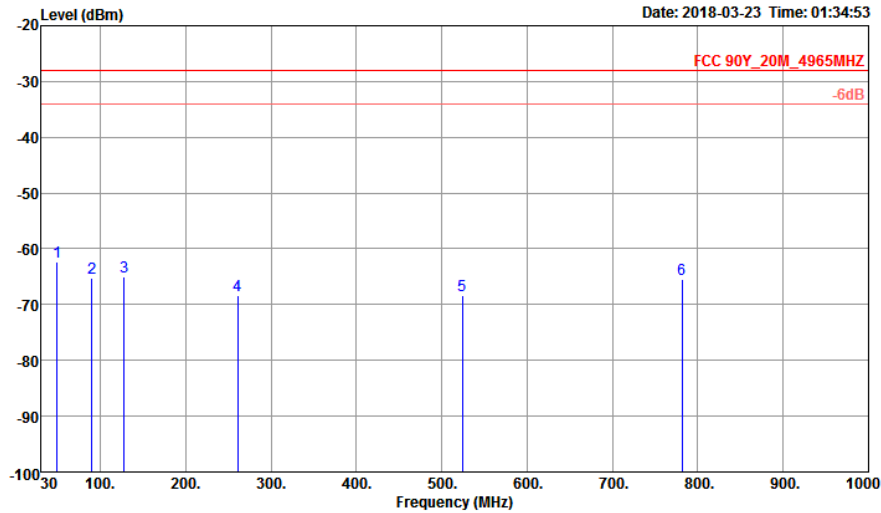


Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	20MHz / 4965MHz

Horizontal



	Freq	Level	Over	Limit	Read		A/Pos	T/Pos		
	MHz	dBm	Limit	Line	Level	Factor			Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	40.67	-55.72	-27.74	-27.98	-69.87	14.15	100	60	Peak	HORIZONTAL
2	49.40	-58.63	-30.65	-27.98	-63.72	5.09	100	124	Peak	HORIZONTAL
3	80.44	-63.55	-35.57	-27.98	-65.02	1.47	125	50	Peak	HORIZONTAL
4	92.08	-64.90	-36.92	-27.98	-69.86	4.96	100	36	Peak	HORIZONTAL
5	495.60	-59.63	-31.65	-27.98	-74.25	14.62	125	142	Peak	HORIZONTAL
6	903.00	-60.05	-32.07	-27.98	-75.55	15.50	100	334	Peak	HORIZONTAL

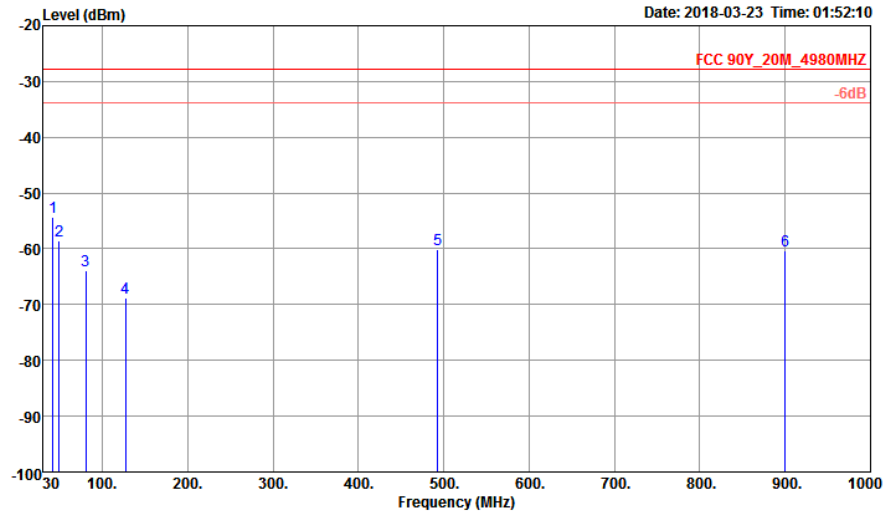
**Vertical**

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	49.40	-62.28	-34.30	-27.98	-53.68	-8.60	100	24	Peak	VERTICAL
2	90.14	-65.25	-37.27	-27.98	-63.11	-2.14	125	324	Peak	VERTICAL
3	127.97	-65.07	-37.09	-27.98	-63.87	-1.20	100	156	Peak	VERTICAL
4	260.86	-68.37	-40.39	-27.98	-74.30	5.93	100	94	Peak	VERTICAL
5	523.73	-68.37	-40.39	-27.98	-72.28	3.91	125	43	Peak	VERTICAL
6	781.75	-65.45	-37.47	-27.98	-75.27	9.82	100	222	Peak	VERTICAL

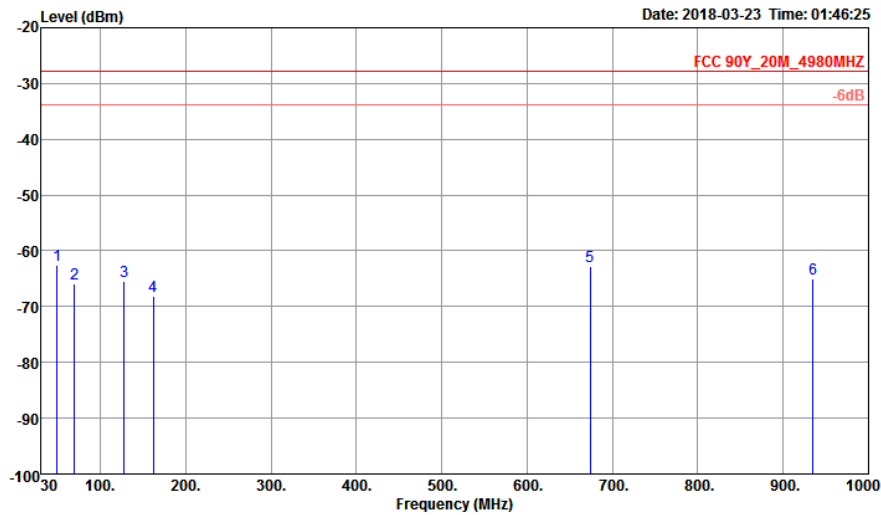


Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	20MHz / 4980MHz

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	41.64	-54.28	-26.38	-27.90	-67.53	13.25	100	153	Peak	HORIZONTAL
2	49.40	-58.50	-30.60	-27.90	-63.59	5.09	150	257	Peak	HORIZONTAL
3	80.44	-63.84	-35.94	-27.90	-65.31	1.47	100	210	Peak	HORIZONTAL
4	127.00	-68.82	-40.92	-27.90	-69.66	0.84	100	315	Peak	HORIZONTAL
5	492.69	-60.12	-32.22	-27.90	-74.41	14.29	125	22	Peak	HORIZONTAL
6	900.09	-60.43	-32.53	-27.90	-76.14	15.71	100	256	Peak	HORIZONTAL

**Vertical**

	Freq	Level	Over	Limit	Read		A/Pos	T/Pos		
	MHz	dBm	Limit	Line	Level	Factor			Remark	Pol/Phase
			dB	dBm	dBm	dB	cm	deg		
1	49.40	-62.46	-34.56	-27.90	-53.86	-8.60	100	52	Peak	VERTICAL
2	69.77	-65.89	-37.99	-27.90	-58.66	-7.23	125	238	Peak	VERTICAL
3	127.97	-65.41	-37.51	-27.90	-64.21	-1.20	125	146	Peak	VERTICAL
4	161.92	-68.15	-40.25	-27.90	-66.25	-1.90	100	236	Peak	VERTICAL
5	674.08	-62.76	-34.86	-27.90	-71.52	8.76	100	168	Peak	VERTICAL
6	935.01	-65.06	-37.16	-27.90	-74.26	9.20	100	106	Peak	VERTICAL

Note1:

The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

Note2:

$EIRP = Pr - Gr + 20 \log (4 * \pi * D / \lambda) - Cr - PAr - Pr$

Where

Pr = Receiver Power

Gr = Gain of receiving antenna

D = Distance in km

Cr = Loss of receiving path

PAr = Gain of receiving amplifier



2.1.7. Results of Transmitter Radiated Unwanted Emissions (1GHz~40GHz)

Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	5MHz / 4942.5MHz
Test Date	Mar. 22, 2018 ~ Mar. 23, 2018		

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2344.71	-52.43	-23.43	-29.00	-64.18	11.75	115	282	Peak	HORIZONTAL
2	3326.05	-50.93	-21.93	-29.00	-65.75	14.82	101	117	Peak	HORIZONTAL
3	6995.31	-42.08	-13.08	-29.00	-64.94	22.86	106	8	Peak	HORIZONTAL
4	9882.67	-31.24	-2.24	-29.00	-53.39	22.15	101	78	Peak	HORIZONTAL
5	10214.09	-42.56	-13.56	-29.00	-65.02	22.46	104	130	Peak	HORIZONTAL
6	14824.86	-40.16	-11.16	-29.00	-64.57	24.41	101	56	Peak	HORIZONTAL

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2343.70	-51.36	-22.36	-29.00	-62.71	11.35	120	91	Peak	VERTICAL
2	3318.00	-47.58	-18.58	-29.00	-62.92	15.34	105	104	Peak	VERTICAL
3	6998.60	-38.11	-9.11	-29.00	-62.94	24.83	108	356	Peak	VERTICAL
4	9886.13	-29.20	-0.20	-29.00	-55.34	26.14	100	155	Peak	VERTICAL
5	10218.50	-37.14	-8.14	-29.00	-63.36	26.22	110	139	Peak	VERTICAL
6	14827.70	-37.85	-8.85	-29.00	-64.55	26.70	101	140	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	5MHz / 4962.5MHz
Test Date	Mar. 22, 2018 ~ Mar. 23, 2018		

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2343.46	-53.61	-24.63	-28.98	-65.36	11.75	105	63	Peak	HORIZONTAL
2	3324.89	-50.92	-21.94	-28.98	-65.74	14.82	107	174	Peak	HORIZONTAL
3	6997.51	-43.47	-14.49	-28.98	-66.33	22.86	111	77	Peak	HORIZONTAL
4	9922.80	-32.24	-3.26	-28.98	-54.38	22.14	100	330	Peak	HORIZONTAL
5	10209.98	-42.86	-13.88	-28.98	-65.32	22.46	110	323	Peak	HORIZONTAL
6	14880.64	-38.49	-9.51	-28.98	-62.86	24.37	100	309	Peak	HORIZONTAL

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2341.73	-53.81	-24.83	-28.98	-65.15	11.34	101	152	Peak	VERTICAL
2	3321.59	-50.40	-21.42	-28.98	-65.74	15.34	115	88	Peak	VERTICAL
3	6993.77	-41.57	-12.59	-28.98	-66.40	24.83	100	113	Peak	VERTICAL
4	9926.51	-30.09	-1.11	-28.98	-56.24	26.15	100	316	Peak	VERTICAL
5	10210.39	-39.05	-10.07	-28.98	-65.27	26.22	101	50	Peak	VERTICAL
6	14891.87	-36.16	-7.18	-28.98	-62.71	26.55	100	298	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	5MHz / 4987.5MHz
Test Date	Mar. 22, 2018 ~ Mar. 23, 2018		

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2342.91	-53.42	-24.72	-28.70	-65.17	11.75	117	307	Peak	HORIZONTAL
2	3327.09	-51.06	-22.36	-28.70	-65.88	14.82	105	247	Peak	HORIZONTAL
3	6994.90	-43.98	-15.28	-28.70	-66.84	22.86	115	43	Peak	HORIZONTAL
4	9972.63	-32.69	-3.99	-28.70	-54.82	22.13	100	267	Peak	HORIZONTAL
5	10209.92	-43.63	-14.93	-28.70	-66.09	22.46	105	359	Peak	HORIZONTAL
6	14958.39	-40.24	-11.54	-28.70	-64.53	24.29	103	255	Peak	HORIZONTAL

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2337.65	-53.62	-24.92	-28.70	-64.96	11.34	106	126	Peak	VERTICAL
2	3324.19	-50.55	-21.85	-28.70	-65.93	15.38	113	182	Peak	VERTICAL
3	6994.30	-41.63	-12.93	-28.70	-66.46	24.83	103	113	Peak	VERTICAL
4	9976.71	-30.05	-1.35	-28.70	-56.20	26.15	116	55	Peak	VERTICAL
5	10227.41	-38.93	-10.23	-28.70	-65.15	26.22	102	193	Peak	VERTICAL
6	14963.98	-37.98	-9.28	-28.70	-64.21	26.23	106	77	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	10MHz / 4945MHz
Test Date	Mar. 22, 2018 ~ Mar. 23, 2018		

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2339.40	-53.53	-24.62	-28.91	-65.28	11.75	100	205	Peak	HORIZONTAL
2	3323.17	-51.49	-22.58	-28.91	-66.27	14.78	104	47	Peak	HORIZONTAL
3	6999.22	-44.21	-15.30	-28.91	-67.07	22.86	118	78	Peak	HORIZONTAL
4	9886.18	-35.00	-6.09	-28.91	-57.15	22.15	100	50	Peak	HORIZONTAL
5	10227.38	-42.79	-13.88	-28.91	-65.25	22.46	115	10	Peak	HORIZONTAL
6	14828.18	-41.08	-12.17	-28.91	-65.49	24.41	100	39	Peak	HORIZONTAL

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2351.47	-53.79	-24.88	-28.91	-65.14	11.35	101	357	Peak	VERTICAL
2	3324.25	-50.23	-21.32	-28.91	-65.61	15.38	109	63	Peak	VERTICAL
3	6986.80	-42.26	-13.35	-28.91	-67.09	24.83	112	341	Peak	VERTICAL
4	9893.99	-31.95	-3.04	-28.91	-58.09	26.14	101	134	Peak	VERTICAL
5	10225.25	-39.62	-10.71	-28.91	-65.84	26.22	103	10	Peak	VERTICAL
6	14840.47	-39.73	-10.82	-28.91	-66.43	26.70	100	152	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	10MHz / 4965MHz
Test Date	Mar. 22, 2018 ~ Mar. 23, 2018		

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2346.69	-53.95	-25.05	-28.90	-65.70	11.75	104	128	Peak	HORIZONTAL
2	3330.20	-50.88	-21.98	-28.90	-65.70	14.82	102	208	Peak	HORIZONTAL
3	6993.96	-43.49	-14.59	-28.90	-66.35	22.86	105	46	Peak	HORIZONTAL
4	9925.70	-34.34	-5.44	-28.90	-56.48	22.14	100	221	Peak	HORIZONTAL
5	10223.99	-43.67	-14.77	-28.90	-66.13	22.46	108	294	Peak	HORIZONTAL
6	14889.49	-41.28	-12.38	-28.90	-65.65	24.37	100	191	Peak	HORIZONTAL

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2333.80	-53.99	-25.09	-28.90	-65.33	11.34	117	121	Peak	VERTICAL
2	3328.64	-50.32	-21.42	-28.90	-65.70	15.38	111	61	Peak	VERTICAL
3	6996.78	-41.59	-12.69	-28.90	-66.42	24.83	110	182	Peak	VERTICAL
4	9932.52	-31.78	-2.88	-28.90	-57.93	26.15	100	343	Peak	VERTICAL
5	10229.11	-39.56	-10.66	-28.90	-65.78	26.22	112	279	Peak	VERTICAL
6	14895.87	-40.05	-11.15	-28.90	-66.44	26.39	100	332	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	10MHz / 4985MHz
Test Date	Mar. 22, 2018 ~ Mar. 23, 2018		

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2342.09	-53.50	-26.14	-27.36	-65.25	11.75	117	42	Peak	HORIZONTAL
2	3317.96	-51.03	-23.67	-27.36	-65.81	14.78	117	40	Peak	HORIZONTAL
3	7001.69	-43.54	-16.18	-27.36	-66.40	22.86	107	102	Peak	HORIZONTAL
4	9965.62	-30.64	-3.28	-27.36	-52.78	22.14	100	60	Peak	HORIZONTAL
5	10229.85	-42.66	-15.30	-27.36	-65.16	22.50	116	150	Peak	HORIZONTAL
6	14949.83	-39.69	-12.33	-27.36	-63.98	24.29	100	44	Peak	HORIZONTAL

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2344.09	-54.57	-27.21	-27.36	-65.92	11.35	103	224	Peak	VERTICAL
2	3322.60	-50.36	-23.00	-27.36	-65.70	15.34	109	149	Peak	VERTICAL
3	7012.63	-41.58	-14.22	-27.36	-66.39	24.81	120	109	Peak	VERTICAL
4	9972.30	-29.33	-1.97	-27.36	-55.48	26.15	101	59	Peak	VERTICAL
5	10204.54	-39.06	-11.70	-27.36	-65.28	26.22	115	59	Peak	VERTICAL
6	14961.08	-38.92	-11.56	-27.36	-65.15	26.23	100	48	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	20MHz / 4950MHz
Test Date	Mar. 22, 2018 ~ Mar. 23, 2018		

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2346.71	-54.04	-25.48	-28.56	-65.79	11.75	119	133	Peak	HORIZONTAL
2	3337.22	-50.52	-21.96	-28.56	-65.38	14.86	109	338	Peak	HORIZONTAL
3	6998.23	-42.28	-13.72	-28.56	-65.14	22.86	100	344	Peak	HORIZONTAL
4	9891.03	-38.02	-9.46	-28.56	-60.17	22.15	100	165	Peak	HORIZONTAL
5	10234.61	-42.53	-13.97	-28.56	-65.03	22.50	116	23	Peak	HORIZONTAL
6	14857.53	-40.83	-12.27	-28.56	-65.20	24.37	100	178	Peak	HORIZONTAL

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2340.86	-53.72	-25.16	-28.56	-65.06	11.34	111	298	Peak	VERTICAL
2	3320.78	-51.05	-22.49	-28.56	-66.39	15.34	105	82	Peak	VERTICAL
3	6994.87	-40.73	-12.17	-28.56	-65.56	24.83	110	195	Peak	VERTICAL
4	9905.27	-33.81	-5.25	-28.56	-59.95	26.14	116	181	Peak	VERTICAL
5	10224.60	-39.49	-10.93	-28.56	-65.71	26.22	110	31	Peak	VERTICAL
6	14856.25	-39.78	-11.22	-28.56	-66.33	26.55	102	201	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	20MHz / 4965MHz
Test Date	Mar. 22, 2018 ~ Mar. 23, 2018		

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2341.84	-54.39	-26.41	-27.98	-66.14	11.75	110	37	Peak	HORIZONTAL
2	3336.18	-50.83	-22.85	-27.98	-65.69	14.86	103	209	Peak	HORIZONTAL
3	6998.98	-42.24	-14.26	-27.98	-65.10	22.86	106	312	Peak	HORIZONTAL
4	9922.59	-36.23	-8.25	-27.98	-58.37	22.14	100	141	Peak	HORIZONTAL
5	10235.89	-42.62	-14.64	-27.98	-65.12	22.50	108	4	Peak	HORIZONTAL
6	14887.36	-41.67	-13.69	-27.98	-66.04	24.37	100	147	Peak	HORIZONTAL

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2344.62	-54.40	-26.42	-27.98	-65.75	11.35	103	78	Peak	VERTICAL
2	3329.06	-50.31	-22.33	-27.98	-65.69	15.38	120	65	Peak	VERTICAL
3	6999.74	-40.78	-12.80	-27.98	-65.61	24.83	112	197	Peak	VERTICAL
4	9938.57	-32.62	-4.64	-27.98	-58.77	26.15	100	48	Peak	VERTICAL
5	10224.08	-39.71	-11.73	-27.98	-65.93	26.22	115	179	Peak	VERTICAL
6	14906.81	-38.73	-10.75	-27.98	-65.12	26.39	100	52	Peak	VERTICAL



Temperature	22°C	Humidity	54%
Test Engineer	Welson Chen	Mode	20MHz / 4980MHz
Test Date	Mar. 22, 2018 ~ Mar. 23, 2018		

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2340.40	-53.46	-25.56	-27.90	-65.21	11.75	118	209	Peak	HORIZONTAL
2	3327.44	-50.74	-22.84	-27.90	-65.56	14.82	107	88	Peak	HORIZONTAL
3	6999.04	-42.55	-14.65	-27.90	-65.41	22.86	117	139	Peak	HORIZONTAL
4	9950.85	-36.06	-8.16	-27.90	-58.20	22.14	100	47	Peak	HORIZONTAL
5	10236.93	-42.48	-14.58	-27.90	-64.98	22.50	103	137	Peak	HORIZONTAL
6	14958.29	-40.88	-12.98	-27.90	-65.17	24.29	100	43	Peak	HORIZONTAL

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	cm	deg		
1	2337.67	-54.46	-26.56	-27.90	-65.80	11.34	110	162	Peak	VERTICAL
2	3318.23	-51.49	-23.59	-27.90	-66.83	15.34	100	310	Peak	VERTICAL
3	6997.77	-40.55	-12.65	-27.90	-65.38	24.83	109	260	Peak	VERTICAL
4	9968.51	-31.51	-3.61	-27.90	-57.66	26.15	100	332	Peak	VERTICAL
5	10206.19	-39.43	-11.53	-27.90	-65.65	26.22	103	55	Peak	VERTICAL
6	14958.52	-38.50	-10.60	-27.90	-64.73	26.23	102	279	Peak	VERTICAL

Note1:

The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

Note2:

$$\text{EIRP} = \text{Pr} - \text{Gr} + 20 \log(4 * \text{Pi} * \text{D} / \lambda) - \text{Cr} - \text{PAr} - \text{Pr}$$

Where

Pr = Receiver Power

Gr = Gain of receiving antenna

D = Distance in km

Cr = Loss of receiving path

PAr = Gain of receiving amplifier

3. List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2017	Aug. 29, 2018	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 05, 2017	Jul. 04, 2018	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2017	May 01, 2018	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 09, 2018	Jan. 08, 2019	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 10, 2017	Jul. 09, 2018	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 06, 2017	May 05, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)

Note: Calibration Interval of instruments listed above is one year.



4. Measurement Uncertainty

Test Items	Uncertainty	Remark
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%