

FCC Test Report (Z-Wave)

Report No.: RF180625E05C-2

FCC ID: 2ABTEG1500

Test Model: Fios-G1500

Received Date: Sep. 18, 2018

Test Date: Sep. 28 to Oct. 18, 2018

Issued Date: Nov. 06, 2018

Applicant: Verizon Online LLC

Address: 1300 I Street NW, Room 400W, Washington, District of Columbia, 20005
United State

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF180625E05C-2	Original release.	Nov. 06, 2018

1 Certificate of Conformity

Product: Fios-G1500

Brand: Verizon

Test Model: Fios-G1500

Sample Status: ENGINEERING SAMPLE

Applicant: Verizon Online LLC

Test Date: Sep. 28 to Oct. 18, 2018

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.249)
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Phoenix Huang , **Date:** Nov. 06, 2018
Phoenix Huang / Specialist

Approved by : Max Chen , **Date:** Nov. 06, 2018
Max Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.249)			
FCC Clause	Test Item	Result	Remarks
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -0.3dB at 908.42MHz.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.08 dB
	6GHz ~ 18GHz	4.98 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (Z-Wave)

Product	Fios-G1500
Brand	Verizon
Test Model	Fios-G1500
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	FSK
Transfer Rate	9.6/40/100 kbit/s
Operating Frequency	908.4 ~ 916MHz
Number of Channel	3
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	NA

Note:

- This report is prepared for FCC class II change. The difference compared with the Report No.: RF180625E05-2 as the following:
 - ◆ Add second source components including resistors, inductors, capacitors, connectors, transistors, diodes and DDR3, these changed components are a part of RF transmitter circuit.
- According to above condition, only Radiated Emissions test items need to be performed. And all data were verified to meet the requirements.
- There are WLAN and Z-Wave technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3
WLAN (2.4GHz)	WLAN (5GHz)	Z-Wave

- Simultaneously transmission condition.

Condition	Technology		
1	WLAN 2.4GHz	WLAN 5GHz	Z-Wave

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

- The USB port of the EUT, it can't connect a WiFi/WWAN dongle and transmit simultaneously.
- The EUT must be supplied with a power adapter as following table:

No.	Brand	Model No.	Spec.
1	Ktec	KSA20C1200300HU	Input: 100-240Vac, 1A, 50-60Hz Output: 12V, 3A DC output cable: Unshielded, 1.5m
2	LEI	MU36-D120300-A1	Input: 100-240Vac, 1.5A, 50-60Hz Output: 12V, 3A DC output cable: Unshielded, 1.5m

Note: In original report: From the above adapters, the radiated emissions worse case was found in **Adapter No. 2**. Therefore only the test data of the mode was recorded in this report.

7. The antennas provided to the EUT, please refer to the following table:

WLAN Directional gain table			
Frequency range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	2.94	Dipole	i-pex(MHF)
5.15 ~ 5.25	3.56		
5.25 ~ 5.35	3.56		
5.47 ~ 5.725	3.56		
5.725 ~ 5.85	3.56		
Z-Wave antenna spec.			
Antenna Net Gain (dBi)	Frequency range (MHz)	Antenna Type	Antenna Connector
1.73	902~928	Dipole	None

Note: More detailed information, please refer to operating description.

8. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

3 channels are provided to this EUT:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	908.42 (9.6kbit/s)	3	916 (100kbit/s)
2	908.4 (40kbit/s)		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE \geq 1G	RE<1G	
-	√	√	-

Where **RE \geq 1G**: Radiated Emission above 1GHz & Bandedge Measurement **RE<1G**: Radiated Emission below 1GHz

Radiated Emission Test (Above 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 3	1, 2, 3	FSK

Radiated Emission Test (Below 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 3	1, 2, 3	FSK

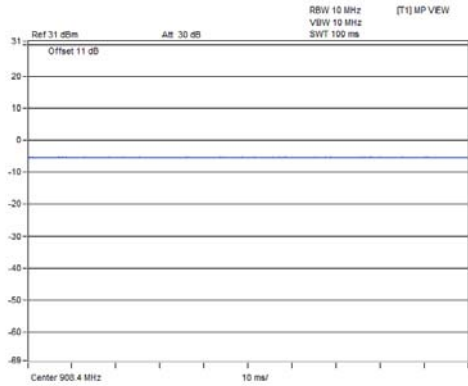
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	22deg. C, 66%RH	120Vac, 60Hz	Steven Chiang
RE<1G	23deg. C, 62%RH	120Vac, 60Hz	Rey Chen

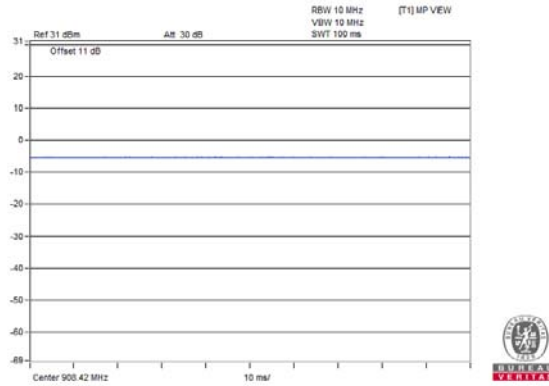
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.

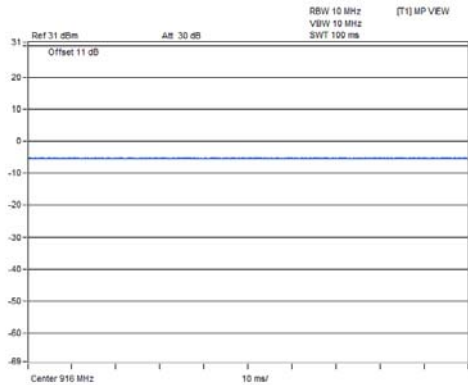
908.42MHz (9.6kbit/s)



908.4MHz (40kbit/s)



916MHz (100kbit/s)



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	iPod	Apple	MC749TA/A	CC4DMFKUDFDM	NA	Provided by Lab
B.	iPod	Apple	MD778TA/A	CC4JMH7LF4T1	NA	Provided by Lab
C.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
D.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	0.1	Yes	0	Provided by Lab
2.	USB Cable	1	0.1	Yes	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	Coaxial Cable	1	10	Yes	0	Provided by Lab
6.	DC Cable	1	1.5	No	0	Supplied by client

3.4.1 Configuration of System under Test

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.249)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

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 as below table, whichever is the lesser attenuation

Frequencies (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

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2018	July 11, 2019
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001	Jan. 15, 2018	Jan. 14, 2019
RF Cable	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 05, 2018	May 04, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-2	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-3	Mar. 20, 2018	Mar. 19, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200	160922	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150317	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150322	Jan. 29, 2018	Jan. 28, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
Pre-Amplifier EMCI	EMC184045SE	980386	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160924	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The CANADA Site Registration No. is 20331-1
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Sep. 28 to Oct. 18, 2018

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

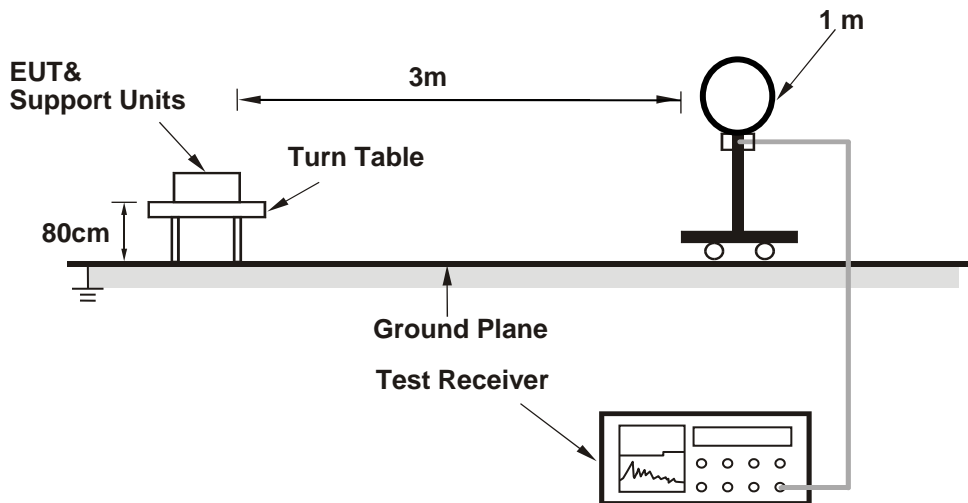
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

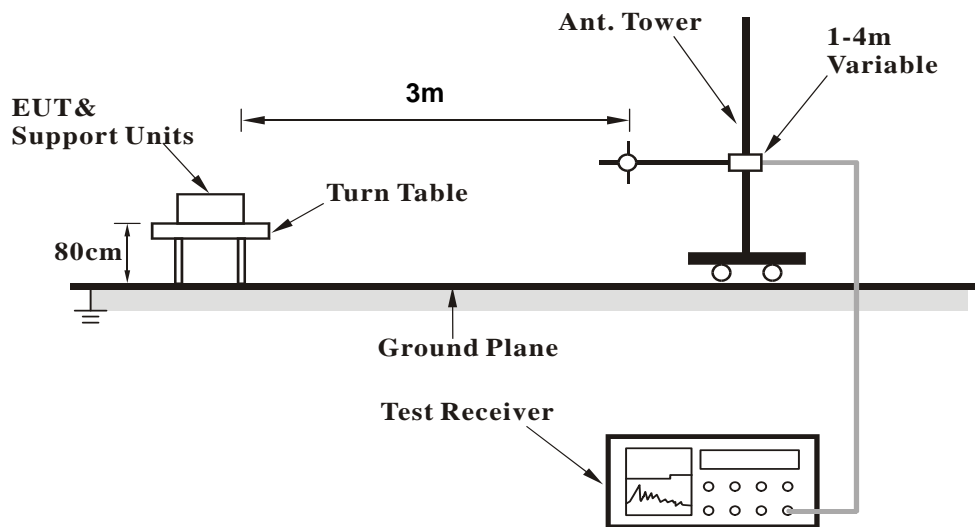
No deviation.

4.1.5 Test Setup

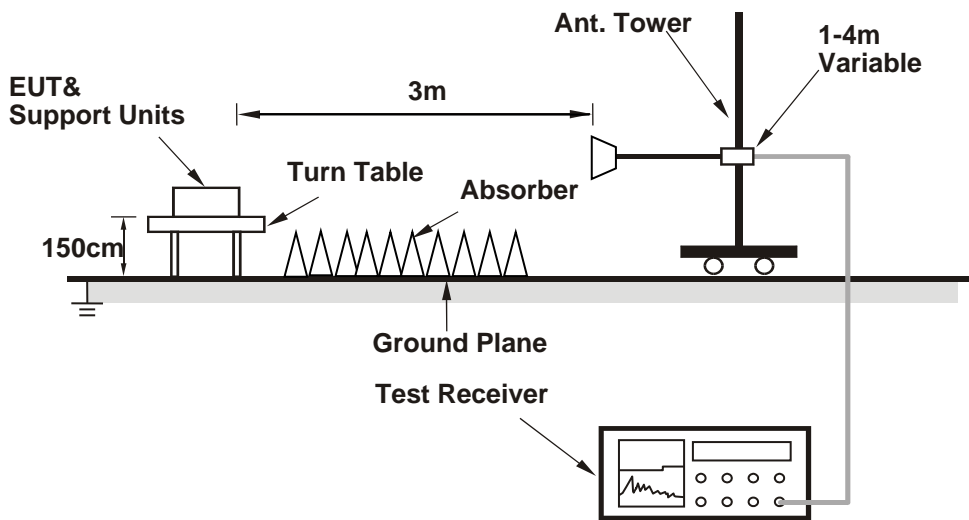
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- a. Connected the EUT with the Laptop which is placed on remote site.
- b. Controlling software (Telnet paste command) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1816.84	43.9 PK	74.0	-30.1	2.29 H	154	49.3	-5.4
2	1816.84	30.6 AV	54.0	-23.4	2.29 H	154	36.0	-5.4
3	2725.26	43.7 PK	74.0	-30.3	2.10 H	144	45.6	-1.9
4	2725.26	30.1 AV	54.0	-23.9	2.10 H	144	32.0	-1.9
5	3633.68	44.2 PK	74.0	-29.8	2.02 H	170	44.9	-0.7
6	3633.68	32.5 AV	54.0	-21.5	2.02 H	170	33.2	-0.7
7	4542.10	51.7 PK	74.0	-22.3	1.77 H	216	50.7	1.0
8	4542.10	38.9 AV	54.0	-15.1	1.77 H	216	37.9	1.0
9	5450.52	53.3 PK	74.0	-20.7	1.87 H	186	50.6	2.7
10	5450.52	43.3 AV	54.0	-10.7	1.87 H	186	40.6	2.7
11	6358.94	55.6 PK	74.0	-18.4	2.05 H	157	50.9	4.7
12	6358.94	44.7 AV	54.0	-9.3	2.05 H	157	40.0	4.7
13	7267.36	54.1 PK	74.0	-19.9	1.35 H	125	46.3	7.8
14	7267.36	42.9 AV	54.0	-11.1	1.35 H	125	35.1	7.8
15	8175.78	57.0 PK	74.0	-17.0	1.61 H	133	48.6	8.4
16	8175.78	44.7 AV	54.0	-9.3	1.61 H	133	36.3	8.4
17	9084.20	43.9 PK	74.0	-30.1	1.91 H	192	34.4	9.5
18	9084.20	41.8 AV	54.0	-12.2	1.91 H	192	32.3	9.5

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1816.84	45.4 PK	74.0	-28.6	1.47 V	225	50.8	-5.4
2	1816.84	32.5 AV	54.0	-21.5	1.47 V	225	37.9	-5.4
3	2725.26	43.9 PK	74.0	-30.1	1.36 V	182	45.8	-1.9
4	2725.26	30.9 AV	54.0	-23.1	1.36 V	182	32.8	-1.9
5	3633.68	44.9 PK	74.0	-29.1	1.47 V	282	45.6	-0.7
6	3633.68	33.2 AV	54.0	-20.8	1.47 V	282	33.9	-0.7
7	4542.10	51.8 PK	74.0	-22.2	1.32 V	255	50.8	1.0
8	4542.10	41.1 AV	54.0	-12.9	1.32 V	255	40.1	1.0
9	5450.52	54.7 PK	74.0	-19.3	1.70 V	246	52.0	2.7
10	5450.52	41.1 AV	54.0	-12.9	1.70 V	246	38.4	2.7
11	6358.94	55.6 PK	74.0	-18.4	1.75 V	236	50.9	4.7
12	6358.94	42.1 AV	54.0	-11.9	1.75 V	236	37.4	4.7
13	7267.36	52.1 PK	74.0	-21.9	1.98 V	56	44.3	7.8
14	7267.36	40.2 AV	54.0	-13.8	1.98 V	56	32.4	7.8
15	8175.78	56.2 PK	74.0	-17.8	2.25 V	97	47.8	8.4
16	8175.78	42.9 AV	54.0	-11.1	2.25 V	97	34.5	8.4
17	9084.20	47.6 PK	74.0	-26.4	2.54 V	177	38.1	9.5
18	9084.20	45.7 AV	54.0	-8.3	2.54 V	177	36.2	9.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1816.80	44.1 PK	74.0	-29.9	2.23 H	147	49.5	-5.4
2	1816.80	30.8 AV	54.0	-23.2	2.23 H	147	36.2	-5.4
3	2725.20	43.2 PK	74.0	-30.8	2.09 H	142	45.1	-1.9
4	2725.20	29.8 AV	54.0	-24.2	2.09 H	142	31.7	-1.9
5	3633.60	44.6 PK	74.0	-29.4	2.06 H	178	45.3	-0.7
6	3633.60	32.6 AV	54.0	-21.4	2.06 H	178	33.3	-0.7
7	4542.00	52.1 PK	74.0	-21.9	1.78 H	210	51.1	1.0
8	4542.00	39.2 AV	54.0	-14.8	1.78 H	210	38.2	1.0
9	5450.40	53.7 PK	74.0	-20.3	1.88 H	195	51.0	2.7
10	5450.40	43.6 AV	54.0	-10.4	1.88 H	195	40.9	2.7
11	6358.80	55.4 PK	74.0	-18.6	2.03 H	168	50.7	4.7
12	6358.80	44.6 AV	54.0	-9.4	2.03 H	168	39.9	4.7
13	7267.20	53.9 PK	74.0	-20.1	1.39 H	126	46.1	7.8
14	7267.20	42.8 AV	54.0	-11.2	1.39 H	126	35.0	7.8
15	8175.60	56.7 PK	74.0	-17.3	1.60 H	121	48.3	8.4
16	8175.60	44.5 AV	54.0	-9.5	1.60 H	121	36.1	8.4
17	9084.00	43.7 PK	74.0	-30.3	1.92 H	184	34.2	9.5
18	9084.00	41.9 AV	54.0	-12.1	1.92 H	184	32.4	9.5

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1816.80	45.0 PK	74.0	-29.0	1.56 V	196	50.4	-5.4
2	1816.80	31.8 AV	54.0	-22.2	1.56 V	196	37.2	-5.4
3	2725.20	43.6 PK	74.0	-30.4	1.45 V	201	45.5	-1.9
4	2725.20	30.5 AV	54.0	-23.5	1.45 V	201	32.4	-1.9
5	3633.60	45.6 PK	74.0	-28.4	1.43 V	284	46.3	-0.7
6	3633.60	34.0 AV	54.0	-20.0	1.43 V	284	34.7	-0.7
7	4542.00	52.2 PK	74.0	-21.8	1.37 V	264	51.2	1.0
8	4542.00	41.4 AV	54.0	-12.6	1.37 V	264	40.4	1.0
9	5450.40	55.0 PK	74.0	-19.0	1.70 V	233	52.3	2.7
10	5450.40	41.9 AV	54.0	-12.1	1.70 V	233	39.2	2.7
11	6358.80	55.5 PK	74.0	-18.5	1.65 V	252	50.8	4.7
12	6358.80	41.9 AV	54.0	-12.1	1.65 V	252	37.2	4.7
13	7267.20	51.7 PK	74.0	-22.3	2.00 V	41	43.9	7.8
14	7267.20	39.8 AV	54.0	-14.2	2.00 V	41	32.0	7.8
15	8175.60	57.5 PK	74.0	-16.5	2.18 V	97	49.1	8.4
16	8175.60	44.0 AV	54.0	-10.0	2.18 V	97	35.6	8.4
17	9084.00	47.4 PK	74.0	-26.6	2.45 V	175	37.9	9.5
18	9084.00	46.0 AV	54.0	-8.0	2.45 V	175	36.5	9.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1832.00	44.1 PK	74.0	-29.9	2.25 H	156	49.5	-5.4
2	1832.00	30.8 AV	54.0	-23.2	2.25 H	156	36.2	-5.4
3	2748.00	43.5 PK	74.0	-30.5	2.11 H	131	45.4	-1.9
4	2748.00	30.0 AV	54.0	-24.0	2.11 H	131	31.9	-1.9
5	3664.00	44.8 PK	74.0	-29.2	2.02 H	154	45.4	-0.6
6	3664.00	32.9 AV	54.0	-21.1	2.02 H	154	33.5	-0.6
7	4580.00	51.2 PK	74.0	-22.8	1.74 H	227	50.0	1.2
8	4580.00	38.5 AV	54.0	-15.5	1.74 H	227	37.3	1.2
9	5496.00	53.6 PK	74.0	-20.4	1.91 H	191	51.1	2.5
10	5496.00	43.6 AV	54.0	-10.4	1.91 H	191	41.1	2.5
11	6412.00	55.6 PK	74.0	-18.4	2.03 H	172	50.8	4.8
12	6412.00	44.6 AV	54.0	-9.4	2.03 H	172	39.8	4.8
13	7328.00	53.7 PK	74.0	-20.3	1.38 H	137	45.8	7.9
14	7328.00	42.6 AV	54.0	-11.4	1.38 H	137	34.7	7.9
15	8244.00	57.1 PK	74.0	-16.9	1.66 H	143	48.8	8.3
16	8244.00	44.6 AV	54.0	-9.4	1.66 H	143	36.3	8.3
17	9160.00	44.2 PK	74.0	-29.8	1.95 H	194	34.4	9.8
18	9160.00	42.1 AV	54.0	-11.9	1.95 H	194	32.3	9.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	1832.00	45.3 PK	74.0	-28.7	1.53 V	226	50.7	-5.4
2	1832.00	32.1 AV	54.0	-21.9	1.53 V	226	37.5	-5.4
3	2748.00	43.7 PK	74.0	-30.3	1.35 V	181	45.6	-1.9
4	2748.00	30.6 AV	54.0	-23.4	1.35 V	181	32.5	-1.9
5	3664.00	45.5 PK	74.0	-28.5	1.43 V	303	46.1	-0.6
6	3664.00	33.8 AV	54.0	-20.2	1.43 V	303	34.4	-0.6
7	4580.00	52.0 PK	74.0	-22.0	1.28 V	250	50.8	1.2
8	4580.00	41.3 AV	54.0	-12.7	1.28 V	250	40.1	1.2
9	5496.00	54.7 PK	74.0	-19.3	1.71 V	254	52.2	2.5
10	5496.00	41.5 AV	54.0	-12.5	1.71 V	254	39.0	2.5
11	6412.00	55.4 PK	74.0	-18.6	1.76 V	222	50.6	4.8
12	6412.00	42.5 AV	54.0	-11.5	1.76 V	222	37.7	4.8
13	7328.00	52.1 PK	74.0	-21.9	1.93 V	50	44.2	7.9
14	7328.00	40.5 AV	54.0	-13.5	1.93 V	50	32.6	7.9
15	8244.00	56.2 PK	74.0	-17.8	2.24 V	112	47.9	8.3
16	8244.00	43.4 AV	54.0	-10.6	2.24 V	112	35.1	8.3
17	9160.00	47.7 PK	74.0	-26.3	2.54 V	165	37.9	9.8
18	9160.00	46.1 AV	54.0	-7.9	2.54 V	165	36.3	9.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

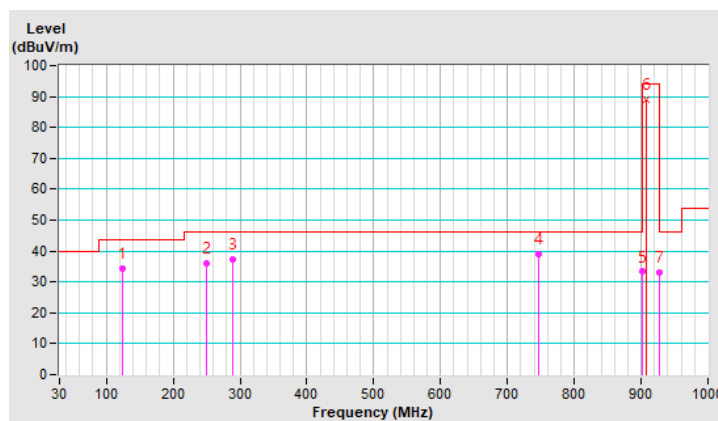
Below 1GHz Data:

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	125.15	34.5 QP	43.5	-9.0	1.00 H	243	43.8	-9.3
2	249.98	36.0 QP	46.0	-10.0	3.00 H	347	44.9	-8.9
3	290.14	37.2 QP	46.0	-8.8	1.50 H	275	44.4	-7.2
4	747.58	38.9 QP	46.0	-7.1	2.00 H	247	35.7	3.2
5	902.00	33.3 QP	46.0	-12.7	1.43 H	217	28.2	5.1
6	*908.42	88.9 QP	94.0	-5.1	1.43 H	217	83.7	5.2
7	928.00	33.2 QP	46.0	-12.8	1.43 H	217	27.9	5.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
5. " * ": Fundamental frequency.



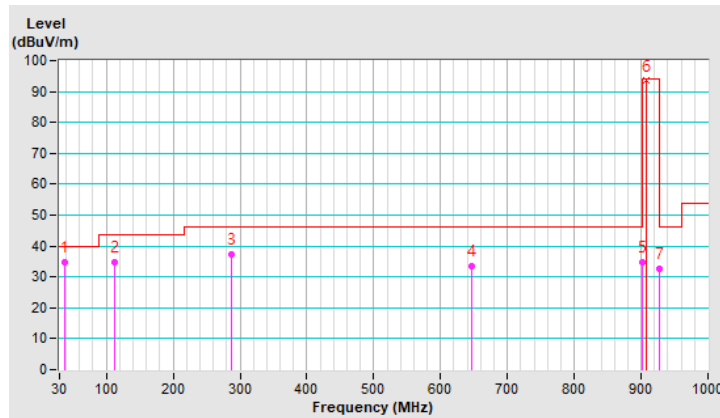
CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	38.45	34.9 QP	40.0	-5.1	1.50 V	222	43.4	-8.5
2	112.56	35.0 QP	43.5	-8.5	2.50 V	269	45.3	-10.3
3	287.44	37.4 QP	46.0	-8.6	1.50 V	274	44.8	-7.4
4	646.18	33.5 QP	46.0	-12.5	1.00 V	235	32.3	1.2
5	902.00	34.9 QP	46.0	-11.1	1.34 V	261	29.8	5.1
6	*908.42	93.5 QP	94.0	-0.5	1.34 V	261	88.3	5.2
7	928.00	32.7 QP	46.0	-13.3	1.34 V	261	27.4	5.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
5. " * ": Fundamental frequency.



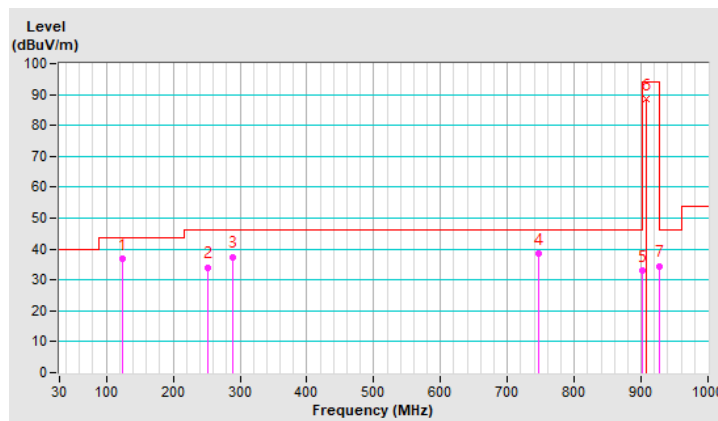
CHANNEL	TX Channel 2	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	124.46	36.7 QP	43.5	-6.8	1.47 H	215	46.1	-9.4
2	251.78	34.1 QP	46.0	-11.9	3.00 H	218	43.0	-8.9
3	289.59	37.3 QP	46.0	-8.7	2.00 H	143	44.5	-7.2
4	746.71	38.4 QP	46.0	-7.6	1.00 H	214	35.2	3.2
5	902.00	32.9 QP	46.0	-13.1	1.22 H	157	27.8	5.1
6	*908.40	88.4 QP	94.0	-5.6	1.22 H	157	83.2	5.2
7	928.00	34.3 QP	46.0	-11.7	1.22 H	157	29.0	5.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
5. " * ": Fundamental frequency.

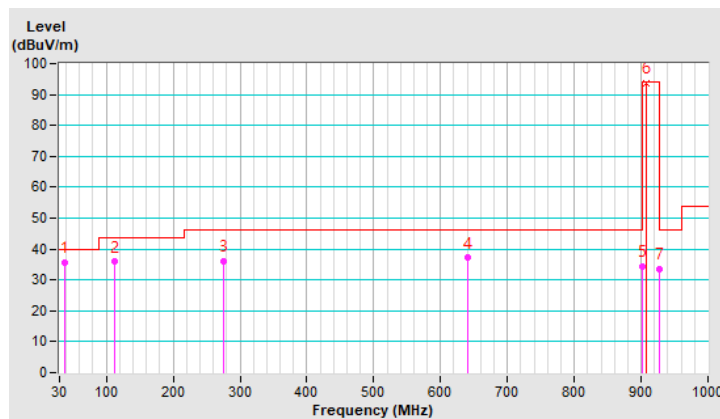


CHANNEL	TX Channel 2	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	38.13	35.5 QP	40.0	-4.5	1.50 V	249	44.0	-8.5
2	112.72	35.8 QP	43.5	-7.7	1.00 V	138	46.1	-10.3
3	274.84	36.0 QP	46.0	-10.0	2.00 V	139	43.8	-7.8
4	640.93	37.1 QP	46.0	-8.9	1.50 V	143	35.9	1.2
5	902.00	34.4 QP	46.0	-11.6	1.17 V	233	29.3	5.1
6	*908.40	93.7 QP	94.0	-0.3	1.17 V	233	88.5	5.2
7	928.00	33.6 QP	46.0	-12.4	1.17 V	233	28.3	5.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
5. " * ": Fundamental frequency.



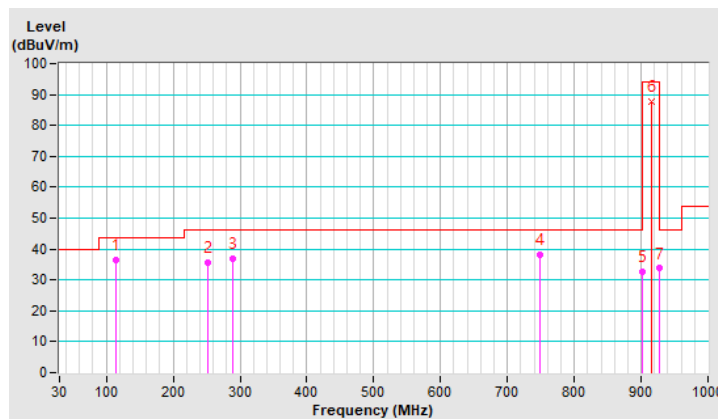
CHANNEL	TX Channel 3	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	113.72	36.6 QP	43.5	-6.9	1.00 H	267	46.8	-10.2
2	251.51	35.7 QP	46.0	-10.3	2.50 H	120	44.6	-8.9
3	289.00	37.0 QP	46.0	-9.0	2.00 H	177	44.3	-7.3
4	748.31	38.2 QP	46.0	-7.8	1.00 H	237	34.9	3.3
5	902.00	32.6 QP	46.0	-13.4	1.74 H	155	27.5	5.1
6	*916.00	87.8 QP	94.0	-6.2	1.74 H	155	82.6	5.2
7	928.00	33.7 QP	46.0	-12.3	1.74 H	155	28.4	5.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
5. " * ": Fundamental frequency.

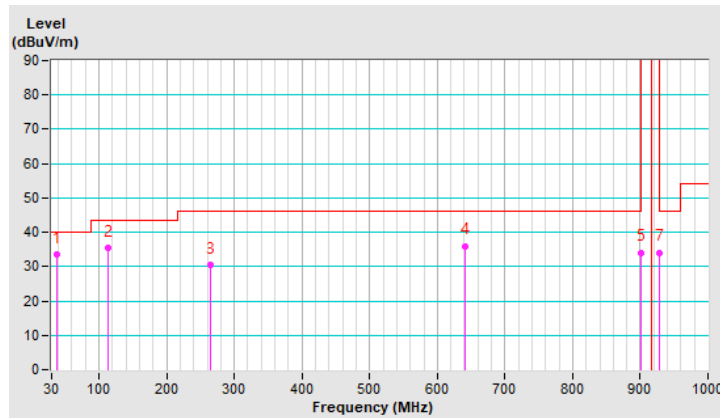


CHANNEL	TX Channel 3	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	37.36	33.7 QP	40.0	-6.3	1.00 V	141	42.4	-8.7
2	112.79	35.3 QP	43.5	-8.2	1.50 V	319	45.6	-10.3
3	264.10	30.6 QP	46.0	-15.4	1.00 V	224	39.0	-8.4
4	641.57	36.0 QP	46.0	-10.0	2.00 V	164	34.8	1.2
5	902.00	34.1 QP	46.0	-11.9	1.16 V	254	29.0	5.1
6	*916.00	93.5 QP	94.0	-0.5	1.16 V	254	88.3	5.2
7	928.00	34.1 QP	46.0	-11.9	1.16 V	254	28.8	5.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.
5. " * ": Fundamental frequency.



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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