FCC Test Report

Report No.:	RF180615C20
FCC ID:	OGSMPR1910A
Test Model:	MPR-1910
Received Date:	Jun. 15, 2018
Test Date:	Sep. 28 ~ Oct. 02, 2018
Issued Date:	Oct. 05, 2018
Applicant:	Applied Wireless Identifications (AWID) Group Inc.
Address:	18300 Sutter Blvd. Morgan Hill, CA, 95037, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF180615C20	Original release	Oct. 05, 2018

1 Certificate of Conformity

Product:	MPR-1910 RFID module
Brand:	AWID
Test Model:	MPR-1910
Sample Status:	Engineering sample
Applicant:	Applied Wireless Identifications (AWID) Group Inc.
Test Date:	Sep. 28 ~ Oct. 02, 2018
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) 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 : Polly Chien , **Date:** Oct. 05, 2018

Polly Chien / Specialist

Approved by : Bruce Chen , **Date:** Oct. 05, 2018

Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -5.96dB at 22.22195MHz.
15.247(a)(1)(i)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(b)(2)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -0.6dB at 8235.00MHz.
15.247(d)	Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -37.6dB at 928.00MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is MMCX not a standard connector.

NOTE: If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	MPR-1910 RFID module
Brand	AWID
Test Model	MPR-1910
Status of EUT	Engineering sample
Power Supply Rating	6Vdc
Modulation Type	ASK
Channel Spacing	200kHz
Operating Frequency	902.6MHz ~ 927.4MHz
Number of Channel	125
Output Power	961.612mW
Antenna Type	Patch antenna with 5.5dBi gain
Antenna Connector	MMCX
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. The adapter is support unit for interface board used only.

Brand	GME
Model	GME24A-120200FUR
Input Power	100-240Vac, 50-60Hz, 0.8A
Output Power	12Vdc, 2A
Power Line	1.56m cable with 1 core attached on adapter

*The 6Vdc voltage of the EUT is converted from the test kit through a 12Vdc adapter.

2. 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

125 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	902.60	25	907.60	50	912.60	75	917.60	100	922.60
1	902.80	26	907.80	51	912.80	76	917.80	101	922.80
2	903.00	27	908.00	52	913.00	77	918.00	102	923.00
3	903.20	28	908.20	53	913.20	78	918.20	103	923.20
4	903.40	29	908.40	54	913.40	79	918.40	104	923.40
5	903.60	30	908.60	55	913.60	80	918.60	105	923.60
6	903.80	31	908.80	56	913.80	81	918.80	106	923.80
7	904.00	32	909.00	57	914.00	82	919.00	107	924.00
8	904.20	33	909.20	58	914.20	83	919.20	108	924.20
9	904.40	34	909.40	59	914.40	84	919.40	109	924.40
10	904.60	35	909.60	60	914.60	85	919.60	110	924.60
11	904.80	36	909.80	61	914.80	86	919.80	111	924.80
12	905.00	37	910.00	62	915.00	87	920.00	112	925.00
13	905.20	38	910.20	63	915.20	88	920.20	113	925.20
14	905.40	39	910.40	64	915.40	89	920.40	114	925.40
15	905.60	40	910.60	65	915.60	90	920.60	115	925.60
16	905.80	41	910.80	66	915.80	91	920.80	116	925.80
17	906.00	42	911.00	67	916.00	92	921.00	117	926.00
18	906.20	43	911.20	68	916.20	93	921.20	118	926.20
19	906.40	44	911.40	69	916.40	94	921.40	119	926.40
20	906.60	45	911.60	70	916.60	95	921.60	120	926.60
21	906.80	46	911.80	71	916.80	96	921.80	121	926.80
22	907.00	47	912.00	72	917.00	97	922.00	122	927.00
23	907.20	48	912.20	73	917.20	98	922.20	123	927.20
24	907.40	49	912.40	74	917.40	99	922.40	124	927.40

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE:
The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane** of the EUT and **Y-plane** of the antenna.

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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
-	0 to 124	0, 62, 124	ASK

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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
-	0 to 124	0, 62, 124	ASK

Power Line Conducted Emission Test:

☒ 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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
-	0 to 124	0, 62, 124	ASK

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ 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.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY
-	0 to 124	0, 62, 124	ASK

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (System)	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Han Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Han Wu
PLC	25deg. C, 76%RH	120Vac, 60Hz	Greg Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Chris Lin

3.3 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.

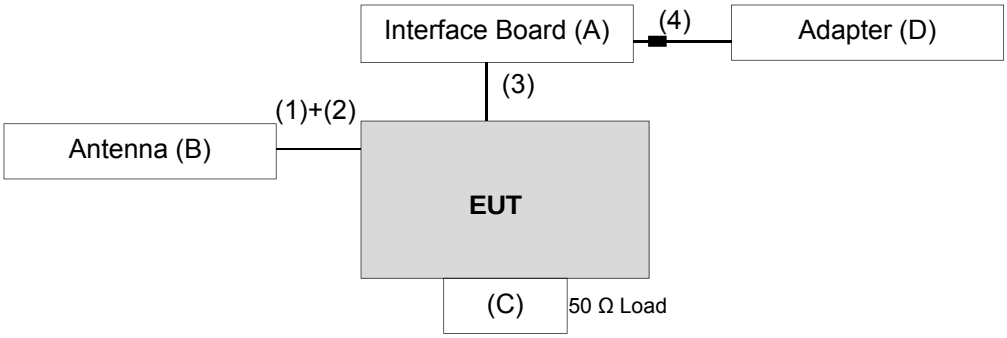
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Interface Board	NA	NA	NA	NA	Provided by manufacturer
B.	External ANT	NA	ANT- 915 CP-R	NA	NA	Provided by manufacturer
C.	50 Ω Load	NA	NA	NA	NA	Provided by manufacturer
D.	Adapter	GME	GME24A-120200FUR	NA	NA	Provided by manufacturer

Note: 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.	SMA cable	1	3	-	0	Provided by manufacturer
2.	SMA to MMCX cable	1	0.08	-	0	Provided by manufacturer
3.	FFC cable	1	0.05	-	0	Provided by manufacturer
4.	Power cable	1	1.56	-	1	Provided by manufacturer

Note**:** The core(s) is(are) originally attached to the cable(s).

3.3.1 Configuration of System under Test



3.4 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 (15.247)
KDB 558074 D01 15.247 Meas Guidance v05
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

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 11, 2018	Apr. 10, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	May 29, 2018	May 28, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Dec. 12, 2017	Dec. 11, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna TESEQ	HLA 6121	45745	Jun. 14, 2018	Jun. 13, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Aug. 08, 2018	Aug. 07, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A01638	Feb. 22, 2018	Feb. 21, 2019
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 15, 2018	Jan. 14, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Aug. 08, 2018	Aug. 07, 2019
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 31, 2018	Jul. 30, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

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 test was performed in HwaYa Chamber 9.
3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
4. The IC Site Registration No. is IC 7450F-9.

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:

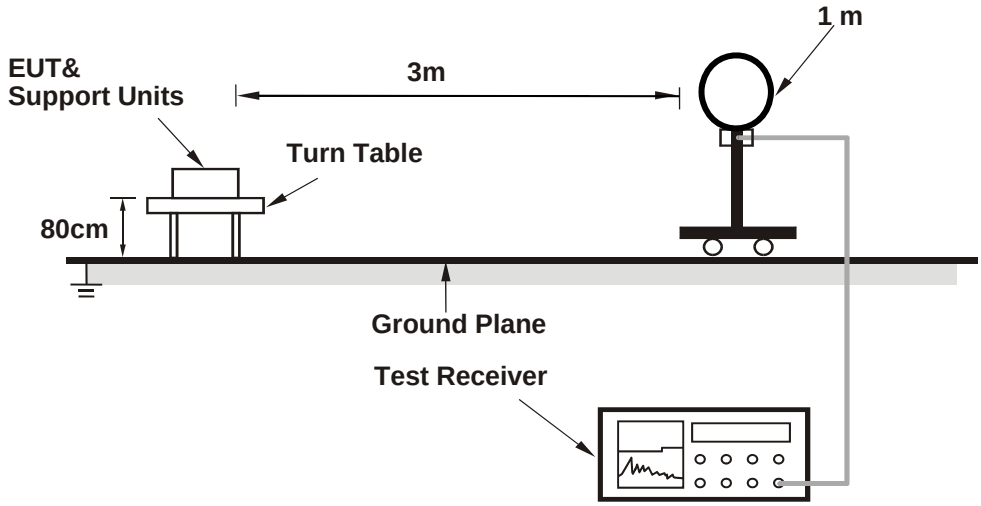
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10 Hz (Duty cycle ≥ 98%) for Peak detection 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

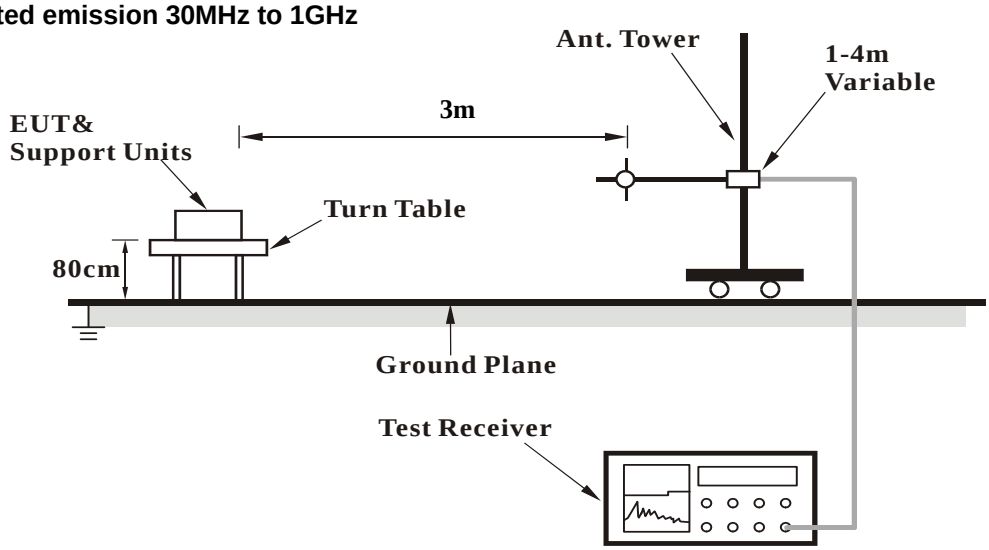
No deviation.

4.1.5 Test Set Up

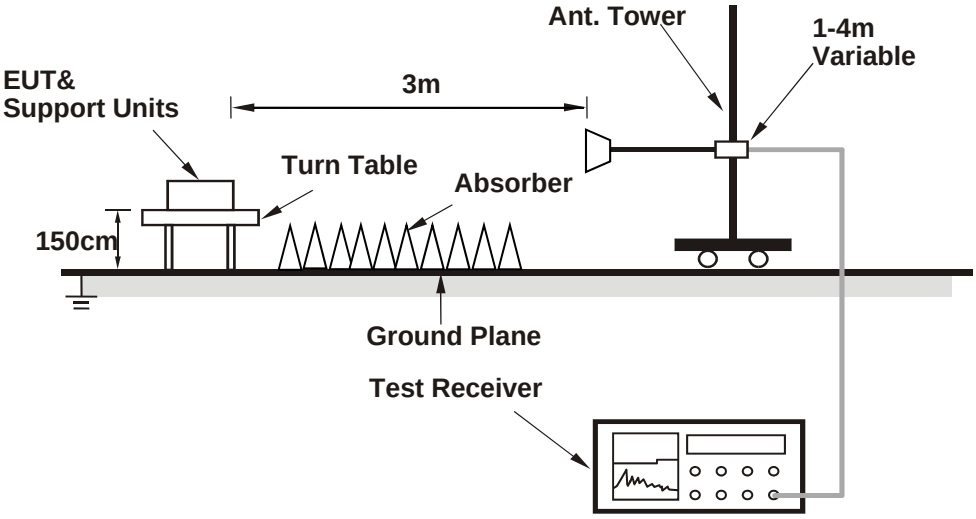
For Radiated emission below 30MHz



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

Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

ABOVE 1GHz DATA：

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 10GHz		

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	902.00	68.0 PK	109.2	-41.2	1.22 H	2	36.30	31.70
2	902.00	55.8 AV	108.3	-52.5	1.22 H	2	24.10	31.70
3	*902.60	129.2 PK			1.22 H	2	97.50	31.70
4	*902.60	128.3 AV			1.22 H	2	96.60	31.70
5	#1805.20	44.5 PK	74.0	-29.5	2.39 H	347	52.00	-7.50
6	#1805.20	40.0 AV	54.0	-14.0	2.39 H	347	47.50	-7.50
7	8123.40	56.8 PK	74.0	-17.2	1.14 H	144	47.80	9.00
8	8123.40	50.7 AV	54.0	-3.3	1.14 H	144	41.70	9.00
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	902.00	67.4 PK	108.5	-41.1	1.00 V	10	35.70	31.70
2	902.00	55.2 AV	107.7	-52.5	1.00 V	10	23.50	31.70
3	*902.60	128.5 PK			1.00 V	10	96.80	31.70
4	*902.60	127.7 AV			1.00 V	10	96.00	31.70
5	#1805.20	47.5 PK	74.0	-26.5	1.85 V	3	55.00	-7.50
6	#1805.20	45.0 AV	54.0	-9.0	1.85 V	3	52.50	-7.50
7	2707.80	53.9 PK	74.0	-20.1	1.72 V	27	58.70	-4.80
8	2707.80	52.3 AV	54.0	-1.7	1.72 V	27	57.10	-4.80
9	3610.40	52.3 PK	74.0	-21.7	1.99 V	15	54.70	-2.40
10	3610.40	48.0 AV	54.0	-6.0	1.99 V	15	50.40	-2.40
11	8123.40	58.2 PK	74.0	-15.8	2.02 V	34	49.20	9.00
12	8123.40	52.3 AV	54.0	-1.7	2.02 V	34	43.30	9.00

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
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 62	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 10GHz		

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	*915.00	129.4 PK			1.23 H	355	97.10	32.30
2	*915.00	128.6 AV			1.23 H	355	96.30	32.30
3	#1830.00	41.9 PK	74.0	-32.1	1.07 H	273	49.30	-7.40
4	#1830.00	38.7 AV	54.0	-15.3	1.07 H	273	46.10	-7.40
5	2745.00	43.6 PK	74.0	-30.4	1.68 H	284	48.20	-4.60
6	2745.00	39.2 AV	54.0	-14.8	1.68 H	284	43.80	-4.60
7	#6405.00	46.8 PK	74.0	-27.2	3.72 H	144	42.20	4.60
8	#6405.00	43.2 AV	54.0	-10.8	3.72 H	144	38.60	4.60
9	8235.00	58.2 PK	74.0	-15.8	3.58 H	163	49.50	8.70
10	8235.00	52.5 AV	54.0	-1.5	3.58 H	163	43.80	8.70
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	*915.00	128.8 PK			1.00 V	6	96.50	32.30
2	*915.00	128.1 AV			1.00 V	6	95.80	32.30
3	#1830.00	33.8 PK	74.0	-40.2	3.98 V	279	41.20	-7.40
4	#1830.00	30.6 AV	54.0	-23.4	3.98 V	279	38.00	-7.40
5	2745.00	44.7 PK	74.0	-29.3	2.33 V	178	49.30	-4.60
6	2745.00	40.0 AV	54.0	-14.0	2.33 V	178	44.60	-4.60
7	#6405.00	50.9 PK	74.0	-23.1	2.45 V	239	46.30	4.60
8	#6405.00	47.6 AV	54.0	-6.4	2.45 V	239	43.00	4.60
9	8235.00	59.3 PK	74.0	-14.7	1.02 V	200	50.60	8.70
10	**8235.00**	**53.4 AV**	**54.0**	**-0.6**	**1.02 V**	**200**	**44.70**	**8.70**

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
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 124	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 10GHz		

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	*927.40	129.3 PK			1.18 H	353	97.00	32.30
2	*927.40	128.5 AV			1.18 H	353	96.20	32.30
3	928.00	66.6 PK	109.3	-42.7	1.18 H	353	34.20	32.40
4	928.00	56.1 AV	108.5	-52.4	1.18 H	353	23.70	32.40
5	#1854.80	41.2 PK	74.0	-32.8	1.82 H	149	48.50	-7.30
6	#1854.80	37.2 AV	54.0	-16.8	1.82 H	149	44.50	-7.30
7	2782.20	45.4 PK	74.0	-28.6	2.63 H	157	50.00	-4.60
8	2782.20	40.9 AV	54.0	-13.1	2.63 H	157	45.50	-4.60
9	8346.60	54.0 PK	74.0	-20.0	3.07 H	297	45.50	8.50
10	8346.60	47.4 AV	54.0	-6.6	3.07 H	297	38.90	8.50
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	*927.40	128.2 PK			1.00 V	2	95.90	32.30
2	*927.40	127.5 AV			1.00 V	2	95.20	32.30
3	928.00	70.6 PK	108.2	-37.6	1.00 V	2	38.20	32.40
4	928.00	56.5 AV	107.5	-51.0	1.00 V	2	24.10	32.40
5	#1854.80	38.0 PK	74.0	-36.0	3.95 V	11	45.30	-7.30
6	#1854.80	31.6 AV	54.0	-22.4	3.95 V	11	38.90	-7.30
7	2782.20	47.2 PK	74.0	-26.8	2.63 V	182	51.80	-4.60
8	2782.20	43.6 AV	54.0	-10.4	2.63 V	182	48.20	-4.60
9	8346.60	53.3 PK	74.0	-20.7	2.99 V	222	44.80	8.50
10	8346.60	47.1 AV	54.0	-6.9	2.99 V	222	38.60	8.50

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
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

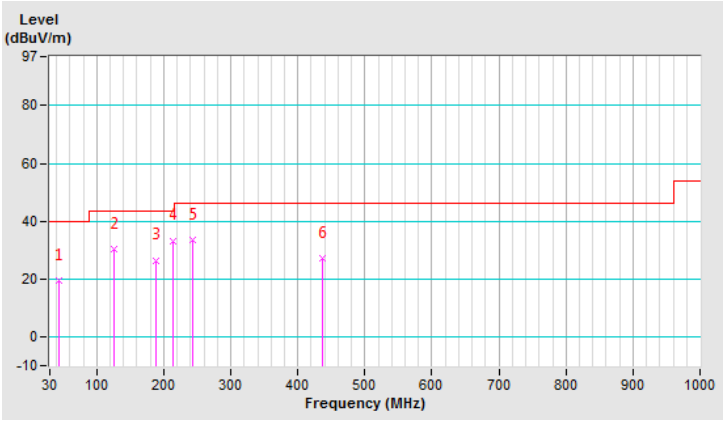
BELOW 1GHz WORST-CASE DATA:

CHANNEL	TX Channel 0	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	43.58	19.4 QP	40.0	-20.6	1.00 H	5	29.00	-9.60
2	125.06	30.2 QP	43.5	-13.3	1.50 H	113	41.30	-11.10
3	188.11	26.5 QP	43.5	-17.0	2.00 H	114	37.80	-11.30
4	214.30	33.3 QP	43.5	-10.2	1.00 H	257	45.00	-11.70
5	242.43	33.7 QP	46.0	-12.3	1.00 H	253	43.70	-10.00
6	436.43	27.4 QP	46.0	-18.6	2.00 H	250	32.50	-5.10

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
5. 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.

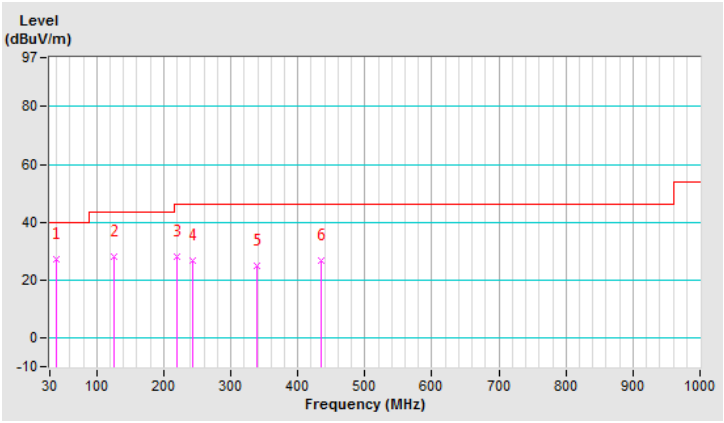


CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	40.67	27.3 QP	40.0	-12.7	1.00 V	258	37.10	-9.80
2	125.06	28.1 QP	43.5	-15.4	1.00 V	225	39.20	-11.10
3	220.12	28.3 QP	46.0	-17.7	1.00 V	353	39.80	-11.50
4	242.43	26.8 QP	46.0	-19.2	1.99 V	187	36.80	-10.00
5	339.43	24.8 QP	46.0	-21.2	1.49 V	157	31.90	-7.10
6	435.46	26.7 QP	46.0	-19.3	1.49 V	76	31.80	-5.10

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
5. 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.

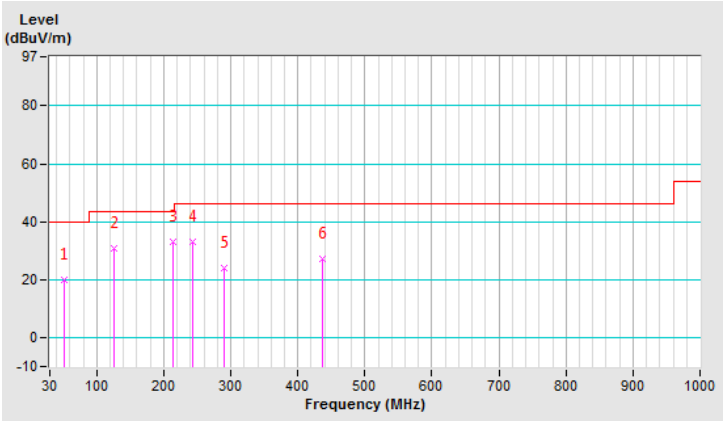


CHANNEL	TX Channel 62	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	51.34	20.0 QP	40.0	-20.0	1.99 H	233	29.50	-9.50
2	125.06	30.7 QP	43.5	-12.8	1.99 H	274	41.80	-11.10
3	214.30	33.2 QP	43.5	-10.3	1.00 H	257	44.90	-11.70
4	242.43	33.0 QP	46.0	-13.0	1.00 H	250	43.00	-10.00
5	290.93	24.1 QP	46.0	-21.9	1.00 H	242	32.00	-7.90
6	436.43	27.3 QP	46.0	-18.7	1.49 H	250	32.40	-5.10

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
5. 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.

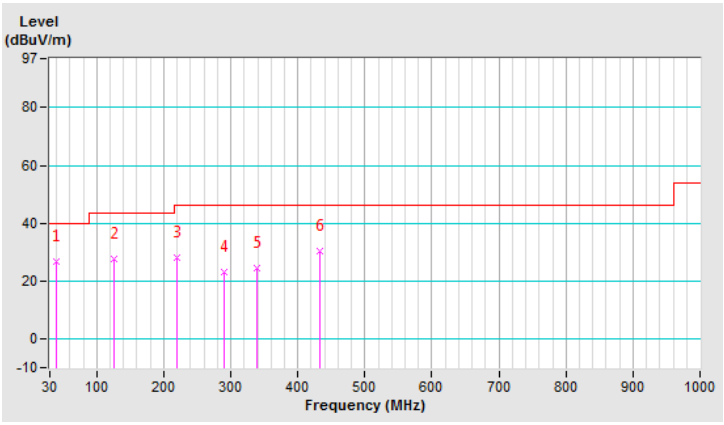


CHANNEL	TX Channel 62	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	40.67	26.9 QP	40.0	-13.1	1.00 V	345	36.70	-9.80
2	125.06	27.5 QP	43.5	-16.0	1.51 V	193	38.60	-11.10
3	220.12	28.1 QP	46.0	-17.9	1.00 V	50	39.60	-11.50
4	290.93	23.3 QP	46.0	-22.7	1.51 V	287	31.20	-7.90
5	339.43	24.6 QP	46.0	-21.4	1.51 V	132	31.70	-7.10
6	432.55	30.2 QP	46.0	-15.8	1.51 V	237	35.40	-5.20

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
5. 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.

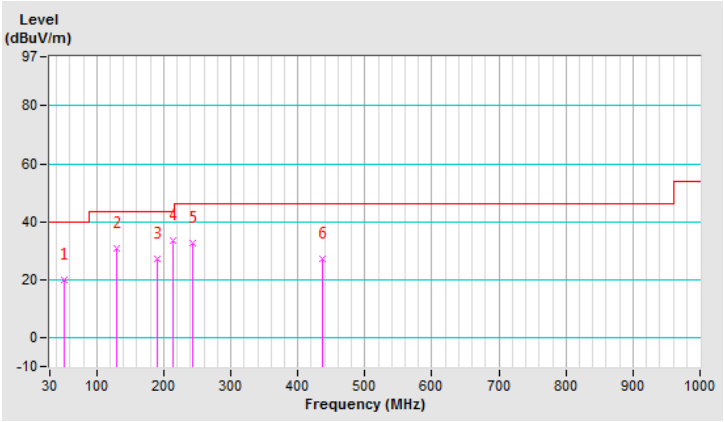


CHANNEL	TX Channel 124	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	51.34	19.8 QP	40.0	-20.2	2.00 H	95	29.30	-9.50
2	128.94	30.6 QP	43.5	-12.9	2.00 H	261	41.20	-10.60
3	190.05	27.0 QP	43.5	-16.5	1.50 H	258	38.40	-11.40
4	213.33	33.4 QP	43.5	-10.1	1.00 H	260	45.10	-11.70
5	242.43	32.4 QP	46.0	-13.6	1.00 H	253	42.40	-10.00
6	436.43	27.1 QP	46.0	-18.9	2.00 H	251	32.20	-5.10

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
5. 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.

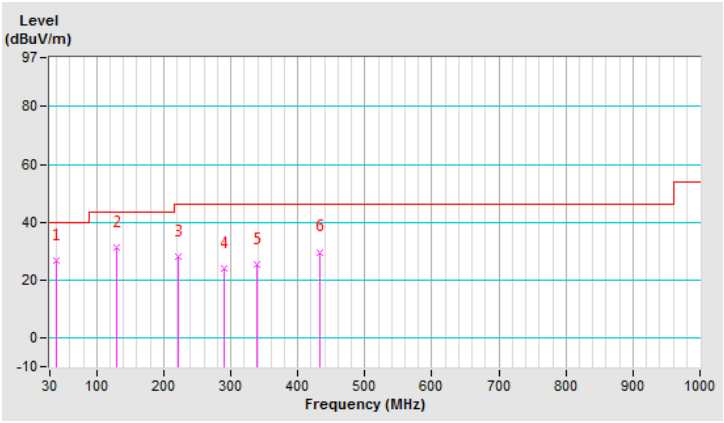


CHANNEL	TX Channel 124	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	40.67	26.9 QP	40.0	-13.1	1.00 V	81	36.70	-9.80
2	128.94	31.3 QP	43.5	-12.2	1.00 V	67	41.90	-10.60
3	221.09	28.3 QP	46.0	-17.7	1.00 V	44	39.80	-11.50
4	290.93	24.1 QP	46.0	-21.9	1.00 V	81	32.00	-7.90
5	339.43	25.3 QP	46.0	-20.7	1.00 V	315	32.40	-7.10
6	432.55	29.7 QP	46.0	-16.3	1.00 V	15	34.90	-5.20

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
5. 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.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

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 test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

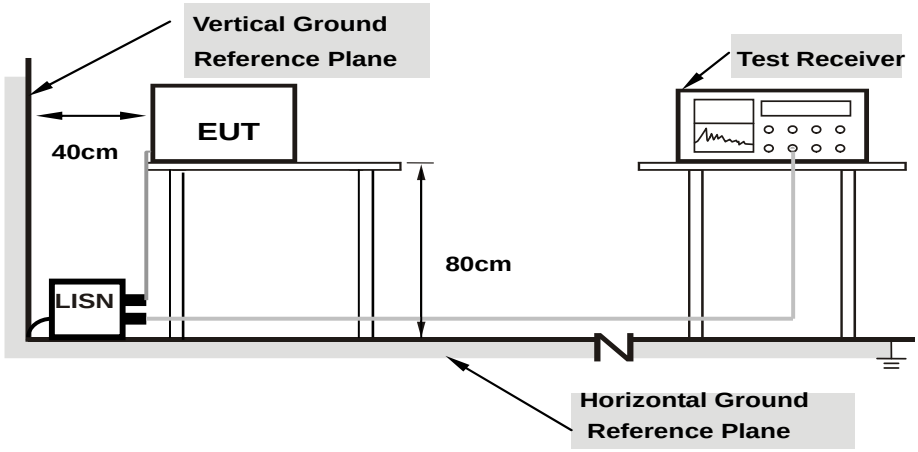
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation From Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

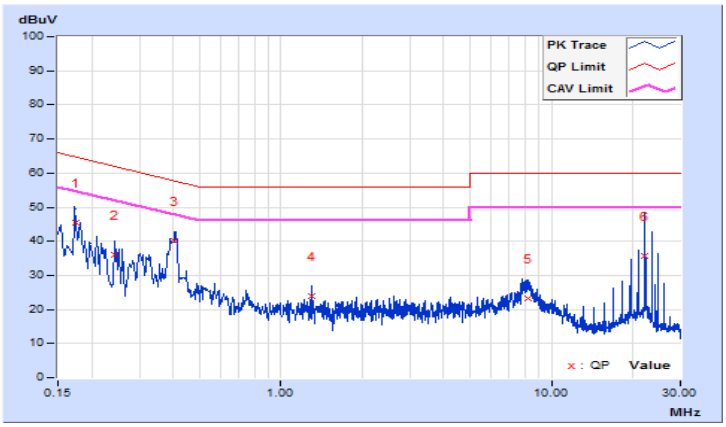
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 0		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17374	9.73	35.68	15.32	45.41	25.05	64.78	54.78	-19.37	-29.73
2	0.24384	9.73	26.31	6.30	36.04	16.03	61.96	51.96	-25.92	-35.93
3	0.40479	9.75	30.43	15.16	40.18	24.91	57.75	47.75	-17.57	-22.84
4	1.30736	9.70	14.10	9.29	23.80	18.99	56.00	46.00	-32.20	-27.01
5	8.23588	9.85	13.54	1.12	23.39	10.97	60.00	50.00	-36.61	-39.03
6	22.21247	9.95	25.82	16.91	35.77	26.86	60.00	50.00	-24.23	-23.14

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

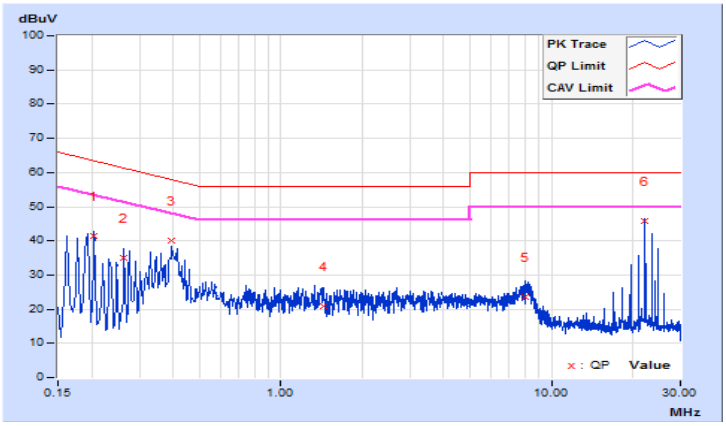


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 0		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20474	9.73	31.71	8.57	41.44	18.30	63.42	53.42	-21.98	-35.12
2	0.26339	9.74	25.33	3.78	35.07	13.52	61.32	51.32	-26.25	-37.80
3	0.39635	9.75	30.20	16.45	39.95	26.20	57.93	47.93	-17.98	-21.73
4	1.44030	9.72	11.17	1.44	20.89	11.16	56.00	46.00	-35.11	-34.84
5	8.02083	9.88	13.65	2.49	23.53	12.37	60.00	50.00	-36.47	-37.63
6	22.22586	10.09	35.74	28.79	45.83	38.88	60.00	50.00	-14.17	-11.12

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

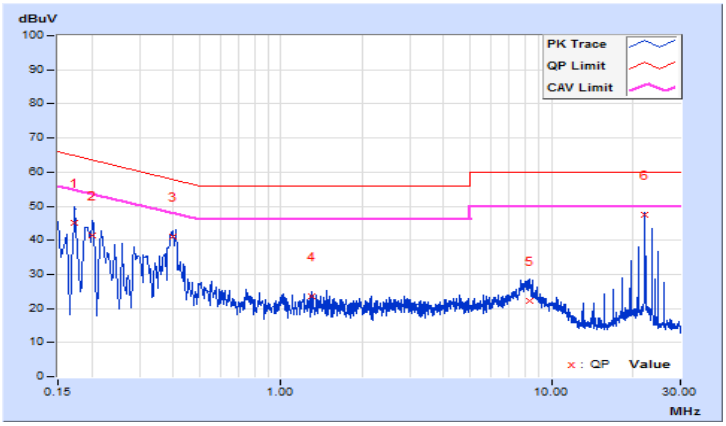


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 62		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17346	9.73	35.41	15.26	45.14	24.99	64.79	54.79	-19.65	-29.80
2	0.20084	9.72	31.73	12.90	41.45	22.62	63.58	53.58	-22.13	-30.96
3	0.40024	9.75	31.29	16.54	41.04	26.29	57.85	47.85	-16.81	-21.56
4	1.30754	9.70	14.01	9.23	23.71	18.93	56.00	46.00	-32.29	-27.07
5	8.30235	9.85	12.51	1.73	22.36	11.58	60.00	50.00	-37.64	-38.42
6	22.22195	9.95	37.43	34.04	47.38	43.99	60.00	50.00	-12.62	-6.01

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

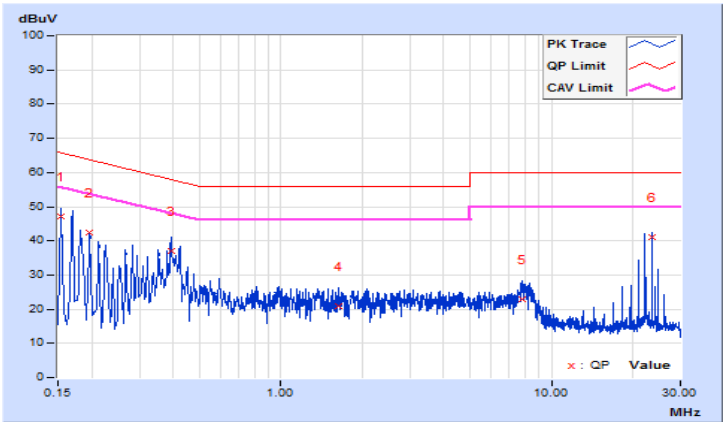


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 62		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.72	37.31	12.96	47.03	22.68	65.79	55.79	-18.76	-33.11
2	0.19692	9.73	32.73	9.24	42.46	18.97	63.74	53.74	-21.28	-34.77
3	0.39242	9.75	27.28	14.87	37.03	24.62	58.01	48.01	-20.98	-23.39
4	1.63971	9.73	11.28	1.50	21.01	11.23	56.00	46.00	-34.99	-34.77
5	7.84097	9.87	13.18	3.44	23.05	13.31	60.00	50.00	-36.95	-36.69
6	23.53180	10.10	30.93	28.08	41.03	38.18	60.00	50.00	-18.97	-11.82

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

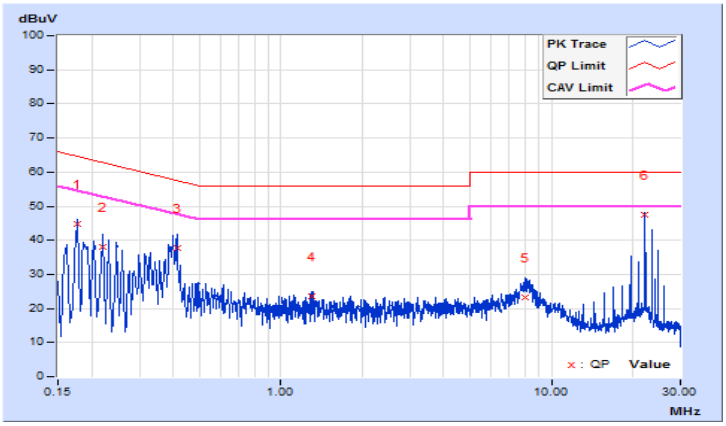


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 124		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17737	9.72	34.94	14.78	44.66	24.50	64.61	54.61	-19.95	-30.11
2	0.22038	9.72	28.40	8.62	38.12	18.34	62.80	52.80	-24.68	-34.46
3	0.41197	9.75	27.93	12.77	37.68	22.52	57.61	47.61	-19.93	-25.09
4	1.30754	9.70	13.96	9.23	23.66	18.93	56.00	46.00	-32.34	-27.07
5	8.02083	9.85	13.49	3.93	23.34	13.78	60.00	50.00	-36.66	-36.22
6	**22.22195**	**9.95**	**37.43**	**34.09**	**47.38**	**44.04**	**60.00**	**50.00**	**-12.62**	**-5.96**

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

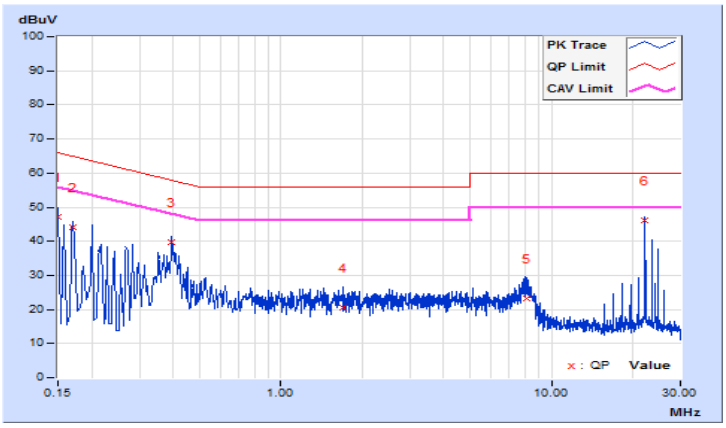


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 124		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.72	37.40	13.53	47.12	23.25	66.00	56.00	-18.88	-32.75
2	0.16967	9.72	34.24	11.56	43.96	21.28	64.98	54.98	-21.02	-33.70
3	0.39635	9.75	30.14	16.43	39.89	26.18	57.93	47.93	-18.04	-21.75
4	1.69445	9.73	10.95	1.03	20.68	10.76	56.00	46.00	-35.32	-35.24
5	8.11076	9.88	13.46	1.87	23.34	11.75	60.00	50.00	-36.66	-38.25
6	22.22586	10.09	35.96	29.13	46.05	39.22	60.00	50.00	-13.95	-10.78

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

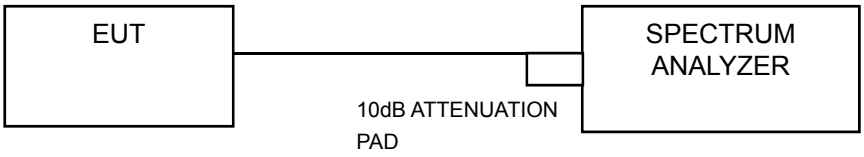


4.3 Number of Hopping Frequency Used

4.3.1 Limits of Hopping Frequency Used Measurement

At least 125 channels frequencies, and should be equally spaced.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.

c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.

d. Set the SA on View mode and then plot the result on SA screen.

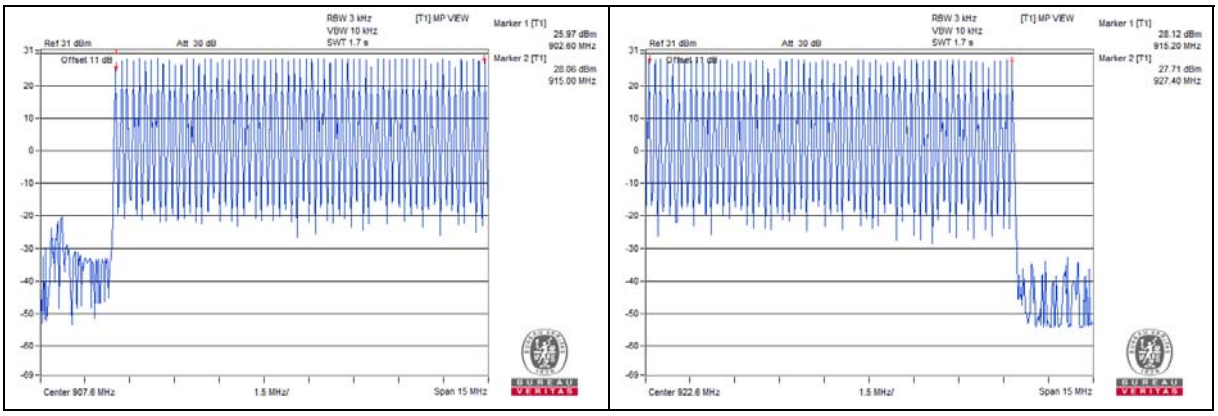
e. Repeat above procedures until all frequencies measured were complete.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 Test Results

There are 125 hopping frequencies in the hopping mode. On the plots, it shows that the hopping frequencies are equally spaced.

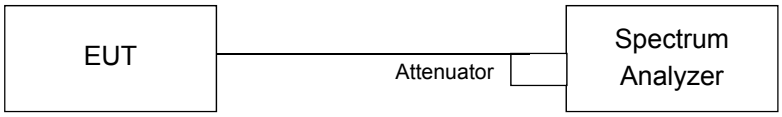


4.4 Dwell Time on Each Channel

4.4.1 Limits of Dwell Time on Each Channel Measurement

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

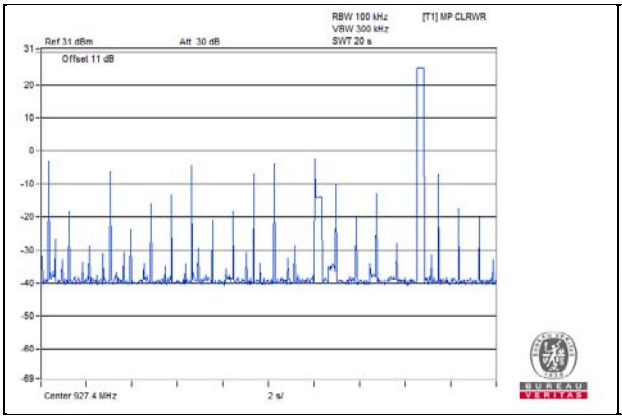
4.4.5 Deviation from Test Standard

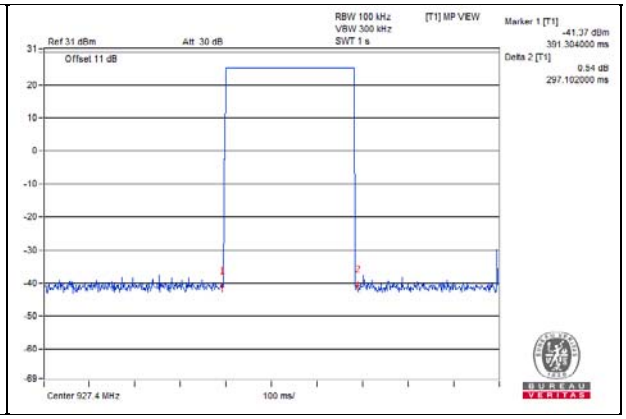
No deviation.

4.4.6 Test Results

Number of transmission in a 20 (sec)	Length of transmission time (msec)	Result (msec)	Limit (msec)
1 (times / 20 sec) * 1 = 1 times	297.102	297.102	400

NOTE: Test plots of the transmitting time slot are shown on following.



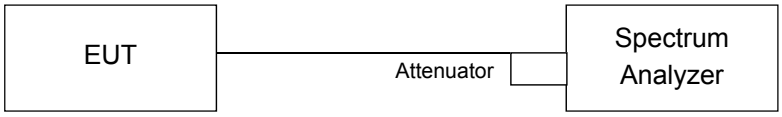


4.5 Channel Bandwidth

4.5.1 Limits of Channel Bandwidth Measurement

The maximum allowed 20 dB bandwidth of the hopping channel is 250 kHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
d. Repeat above procedures until all frequencies measured were complete.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

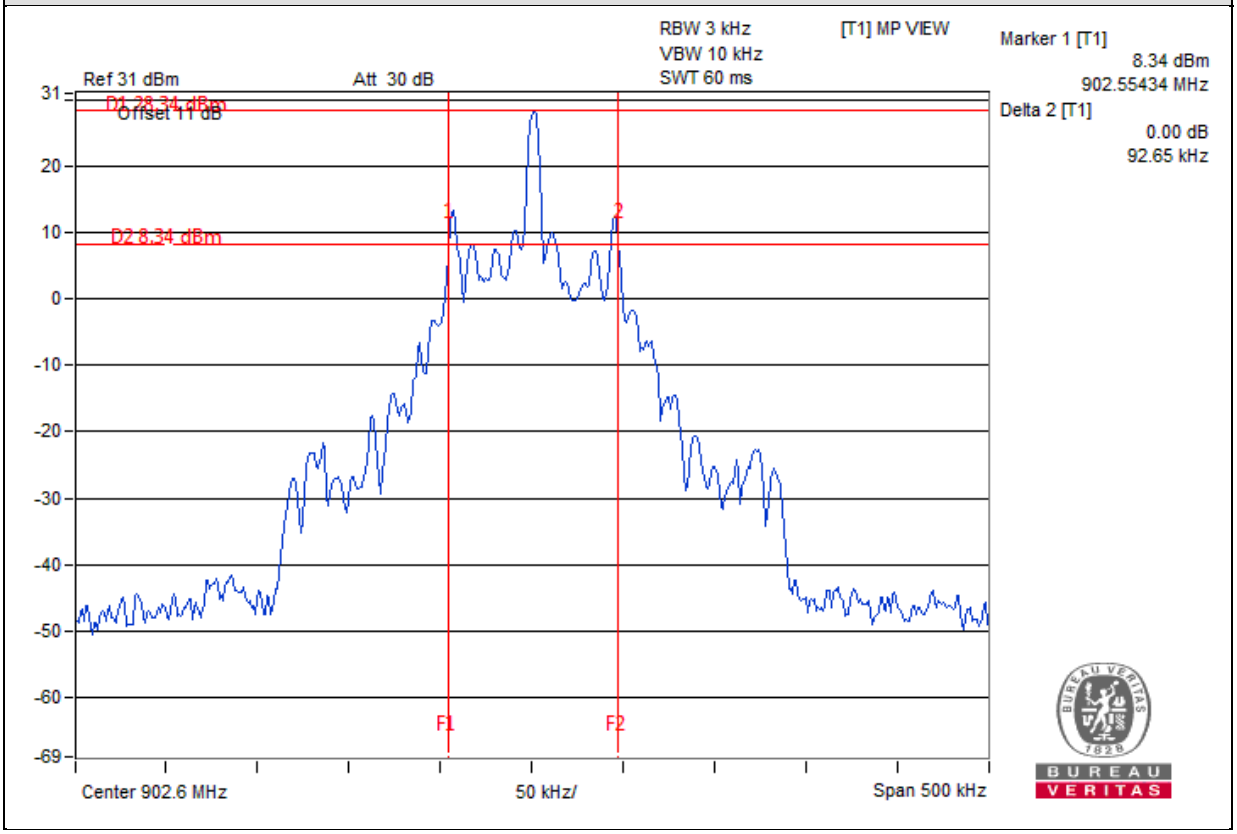
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
0	902.6	0.09265	0.25
62	915.0	0.09000	0.25
124	927.4	0.09000	0.25

Note: 20 dB bandwidth of the hopping channel is less than 500 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

SPECTRUM PLOT OF WORST VALUE

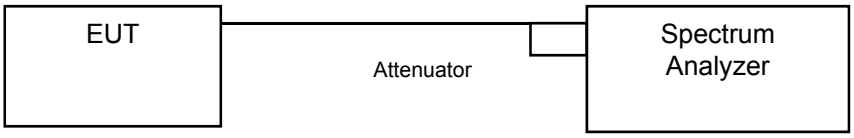


4.6 Hopping Channel Separation

4.6.1 Limits of Hopping Channel Separation Measurement

At least 25kHz or 20dB hopping channel bandwidth (whichever is greater).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.

c. By using the MaxHold function record the separation of two adjacent channels.

d. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.

e. Repeat above procedures until all frequencies measured were complete.

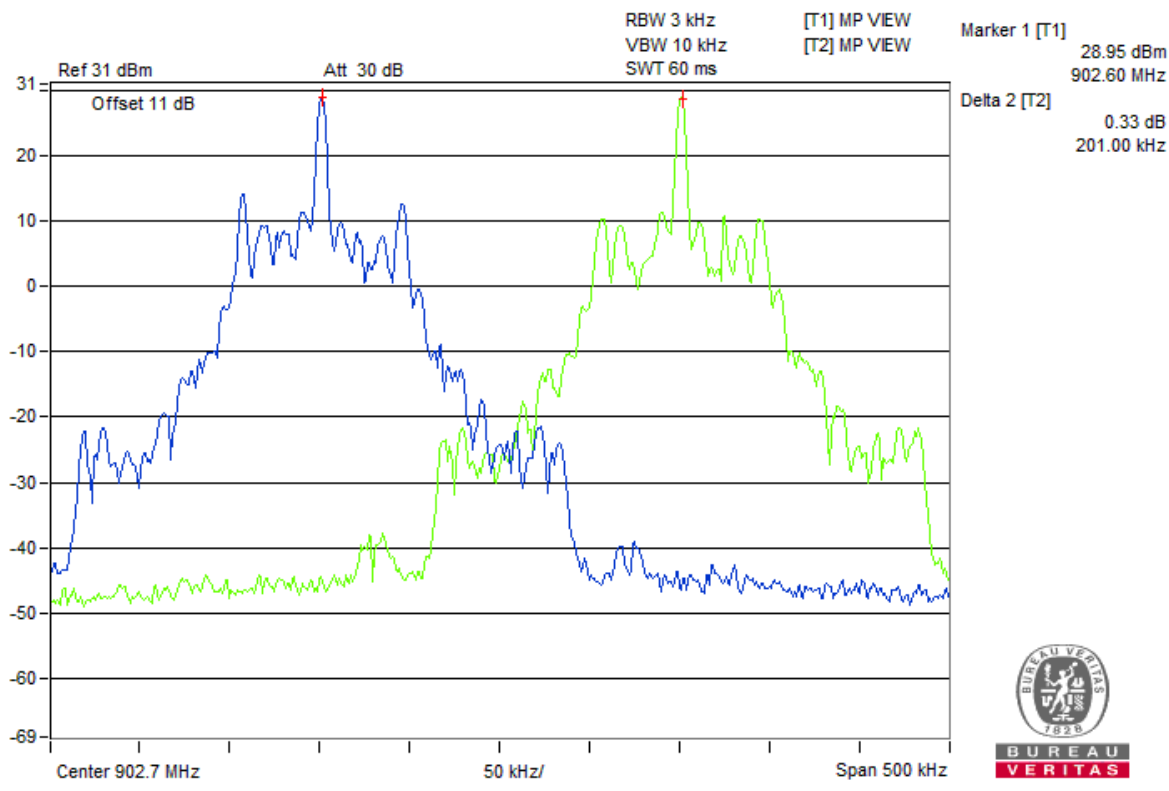
4.6.5 Deviation from Test Standard

No deviation.

4.6.6 Test Results

Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	Minimum Limit (MHz)	Pass / Fail
0	902.6	0.201	0.093	PASS
62	915.0	0.201	0.090	PASS
124	927.4	0.201	0.090	PASS

SPECTRUM PLOT OF WORST VALUE

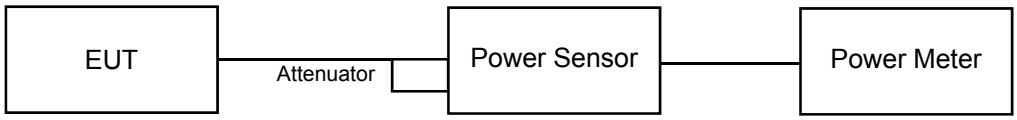


4.7 Maximum Output Power

4.7.1 Limits of Maximum Output Power Measurement

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the power level.

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

Channel	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Power Limit (dBm)	Pass / Fail
0	902.6	948.418	29.77	30	PASS
62	915.0	935.406	29.71	30	PASS
124	927.4	**961.612**	29.83	30	PASS

4.8 Conducted Out of Band Emission Measurement

4.8.1 Limits Of Conducted Out of Band Emission Measurement

Below –20dB of the highest emission level of operating band (in 100kHz RBW).

4.8.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.8.3 Test Procedure

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 Deviation from Test Standard

No deviation.

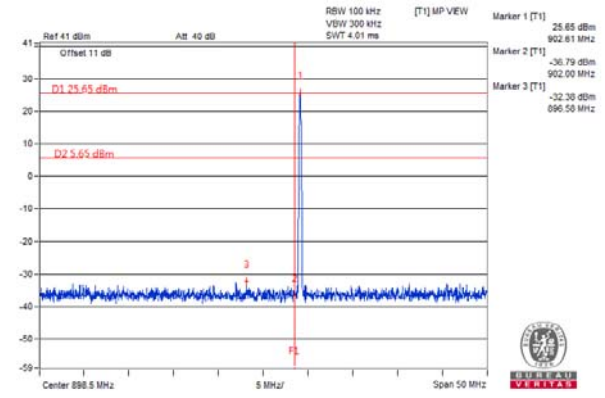
4.8.5 EUT Operating Condition

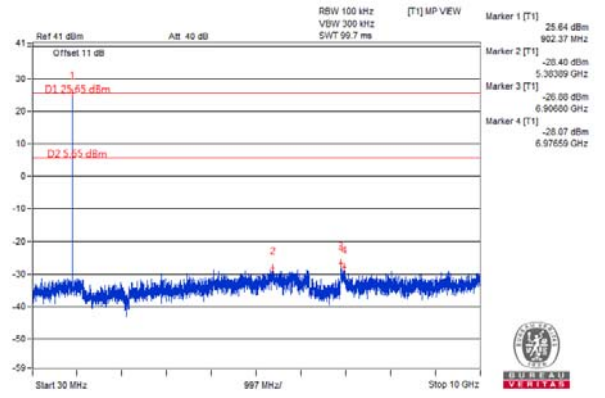
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.6 Test Results

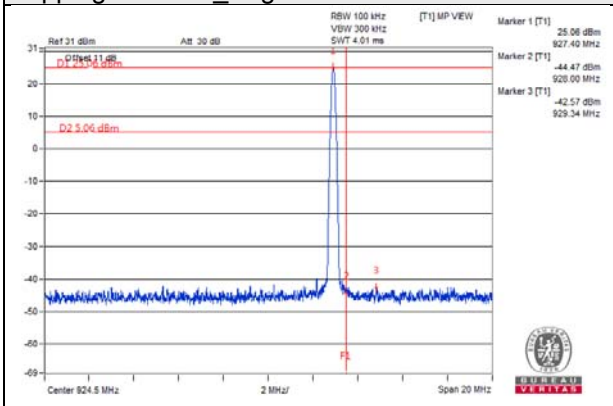
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

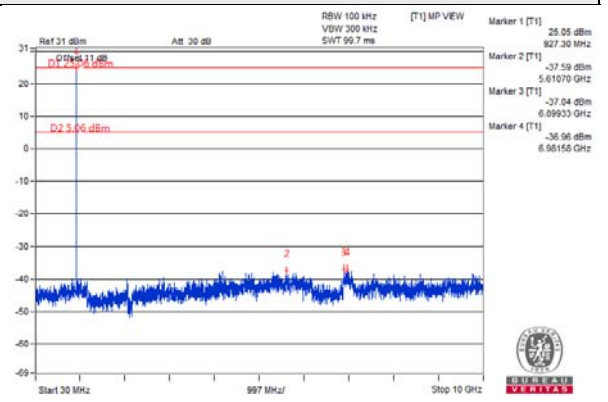
Hopping disabled_ Low Channel



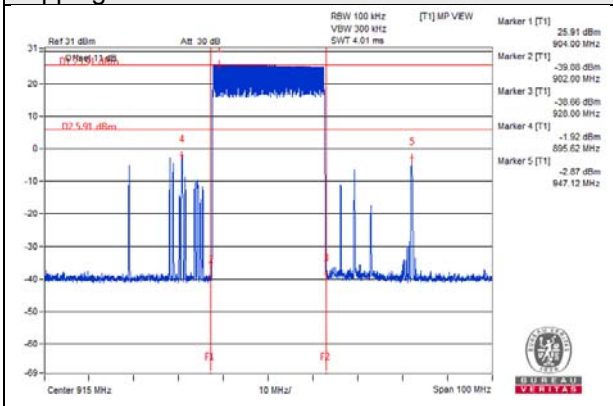


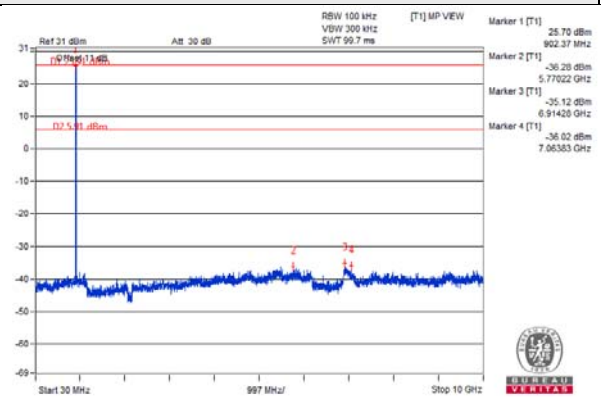
Hopping disabled_ High Channel





Hopping enabled





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 and approved according to ISO/IEC 17025.

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

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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