

## FCC Test Report (LoRa)

**Report No.:** RF191008E02

**FCC ID:** 2ARXKRG1008M

**Test Model:** RG-1008M

**Received Date:** Oct. 08, 2019

**Test Date:** Nov. 27 to Dec. 10, 2019

**Issued Date:** Feb. 07, 2020

**Applicant:** Veea Inc.

**Address:** 164 E 83rd Street, New York NY, 10028

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Hsin Chu Laboratory

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan

**Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan

**FCC Registration /  
Designation Number:** 723255 / TW2022



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

## Table of Contents

<b>Release Control Record</b> .....	<b>4</b>
<b>1 Certificate of Conformity</b> .....	<b>5</b>
<b>2 Summary of Test Results</b> .....	<b>6</b>
2.1 Measurement Uncertainty .....	6
2.2 Modification Record .....	6
<b>3 General Information</b> .....	<b>7</b>
3.1 General Description of EUT (LoRa) .....	7
3.2 Description of Test Modes .....	8
3.2.1 Test Mode Applicability and Tested Channel Detail .....	9
3.3 Duty Cycle of Test Signal .....	10
3.4 Description of Support Units .....	11
3.4.1 Configuration of System under Test .....	12
3.5 General Description of Applied Standards and references .....	13
<b>4 Test Types and Results</b> .....	<b>14</b>
4.1 Radiated Emission and Bandedge Measurement .....	14
4.1.1 Limits of Radiated Emission and Bandedge Measurement .....	14
4.1.2 Test Instruments .....	15
4.1.3 Test Procedures .....	16
4.1.4 Deviation from Test Standard .....	16
4.1.5 Test Setup .....	17
4.1.6 EUT Operating Conditions .....	18
4.1.7 Test Results .....	19
4.2 Conducted Emission Measurement .....	34
4.2.1 Limits of Conducted Emission Measurement .....	34
4.2.2 Test Instruments .....	34
4.2.3 Test Procedures .....	35
4.2.4 Deviation from Test Standard .....	35
4.2.5 Test Setup .....	35
4.2.6 EUT Operating Conditions .....	35
4.2.7 Test Results .....	36
4.3 6dB Bandwidth Measurement .....	38
4.3.1 Limits of 6dB Bandwidth Measurement .....	38
4.3.2 Test Setup .....	38
4.3.3 Test Instruments .....	38
4.3.4 Test Procedure .....	38
4.3.5 Deviation from Test Standard .....	38
4.3.6 EUT Operating Conditions .....	38
4.3.7 Test Results .....	39
4.4 Conducted Output Power Measurement .....	40
4.4.1 Limits of Conducted Output Power Measurement .....	40
4.4.2 Test Setup .....	40
4.4.3 Test Instruments .....	40
4.4.4 Test Procedures .....	40
4.4.5 Deviation from Test Standard .....	40
4.4.6 EUT Operating Conditions .....	40
4.5 Power Spectral Density Measurement .....	42
4.5.1 Limits of Power Spectral Density Measurement .....	42
4.5.2 Test Setup .....	42
4.5.3 Test Instruments .....	42
4.5.4 Test Procedure .....	42
4.5.5 Deviation from Test Standard .....	42
4.5.6 EUT Operating Condition .....	42
4.5.7 Test Results .....	43

4.6	Conducted Out of Band Emission Measurement .....	44
4.6.1	Limits of Conducted Out of Band Emission Measurement.....	44
4.6.2	Test Setup.....	44
4.6.3	Test Instruments .....	44
4.6.4	Test Procedure .....	44
4.6.5	Deviation from Test Standard .....	44
4.6.6	EUT Operating Condition .....	44
4.6.7	Test Results .....	44
<b>5</b>	<b>Pictures of Test Arrangements.....</b>	<b>46</b>
	<b>Appendix – Information of the Testing Laboratories .....</b>	<b>47</b>

### Release Control Record

Issue No.	Description	Date Issued
RF191008E02	Original release.	Feb. 07, 2020

## 1 Certificate of Conformity

**Product:** LoRaWAN Gateway module

**Brand:** Veea

**Test Model:** RG-1008M

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Veea Inc.

**Test Date:** Nov. 27 to Dec. 10, 2019

**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 :**  , **Date:** Feb. 07, 2020  
Claire Kuan / Specialist

**Approved by :**  , **Date:** Feb. 07, 2020  
Clark Lin / Technical Manager

## 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 -10.33 dB at 0.41563MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -2.1 dB at 3700.40MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is N Male, N Female, SMA Male. (The device is professionally installed)

### Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 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	1.8 dB
Conducted Emissions	-	3.1 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT (LoRa)

Product	LoRaWAN Gateway module
Brand	Veea
Test Model	RG-1008M
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	CSS
Modulation Technology	DTS
Transfer Rate	DR0~DR4 & DR8~DR13(500kHz) : 980 ~ 21900 bps/s
Operating Frequency	Tx (BW:500kHz) : 923.3 MHz – 927.5 MHz Rx (BW:125kHz) : 902.3 MHz – 914.9 MHz Rx (BW:500kHz) : 923.3 MHz – 927.5 MHz
Number of Channel	Tx (BW:500kHz) : 8 channels Rx (BW:125kHz) : 64 channels Rx (BW:500kHz) : 8 channels
Output Power	320.627 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

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

Antenna No.	Antenna Model	Antenna Gain (dBi)	Frequency Range	Antenna Type	Connector Type	Cable Length(mm)
1	MFB9153	3	902-928 MHz	Dipole	N Female	1169.4(Outdoor) 1014.4(Indoor)
2	MFB9155NF	5	902-928MHz	Dipole	N Female	1169.4(Outdoor) 1014.4(Indoor)
3	MPAMB700MSMA	2	698-960 MHz	Dipole	SMA Male	100
4	ET915NPMR	2.7	902-928 MHz	Dipole	N Male	255

Note: Max. gain was selected for the final test.

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

Tx (BW:500kHz): 8 channels

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
<b>1</b>	<b>923.3</b>	3	924.5	5	925.7	7	926.9
2	923.9	<b>4</b>	<b>925.1</b>	6	926.3	<b>8</b>	<b>927.5</b>

Note:

- The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.

Rx (BW:125kHz): 64 channels

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	902.3	17	905.5	33	908.7	49	911.9
2	902.5	18	905.7	34	908.9	50	912.1
3	902.7	19	905.9	35	909.1	51	912.3
4	902.9	20	906.1	36	909.3	52	912.5
5	903.1	21	906.3	37	909.5	53	912.7
6	903.3	22	906.5	38	909.7	54	912.9
7	903.5	23	906.7	39	909.9	55	913.1
8	903.7	24	906.9	40	910.1	56	913.3
9	903.9	25	907.1	41	910.3	57	913.5
10	904.1	26	907.3	42	910.5	58	913.7
11	904.3	27	907.5	43	910.7	59	913.9
12	904.5	28	907.7	44	910.9	60	914.1
13	904.7	29	907.9	45	911.1	61	914.3
14	904.9	30	908.1	46	911.3	62	914.5
15	905.1	31	908.3	47	911.5	63	914.7
16	905.3	32	908.5	48	911.7	64	914.9

Rx (BW:500kHz): 8 channels

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	903.0	3	906.2	5	909.4	7	912.6
2	904.6	4	907.8	6	911.0	8	914.2



### 3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz & Bandedge Measurement  
**RE $<$ 1G**: Radiated Emission below 1GHz  
**PLC**: Power Line Conducted Emission  
**APCM**: Antenna Port Conducted Measurement

#### **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 8	1, 4, 8	GFSK

#### **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 8	1, 4, 8	GFSK

#### **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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 8	1	GFSK

#### **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.

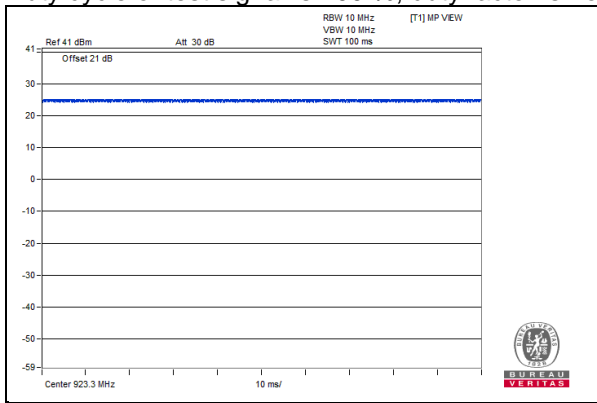
AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 8	1, 4, 8	GFSK

### Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	23deg. C, 70%RH	120Vac, 60Hz	Nelson Teng
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
PLC	23deg. C, 76%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

### 3.3 Duty Cycle of Test Signal

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



### 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.	Laptop	Lenovo	3000 N200	NA	NA	Provided by Lab
B.	Adapter	Lenovo	92P1160	NA	NA	Provided by Lab
C.	Test Tool	ADVANWISE CORPORATION	NA	NA	NA	Supplied by client
D.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
E.	Adapter	DELL	LA65NS2-01	NA	NA	Provided by Lab

Note:

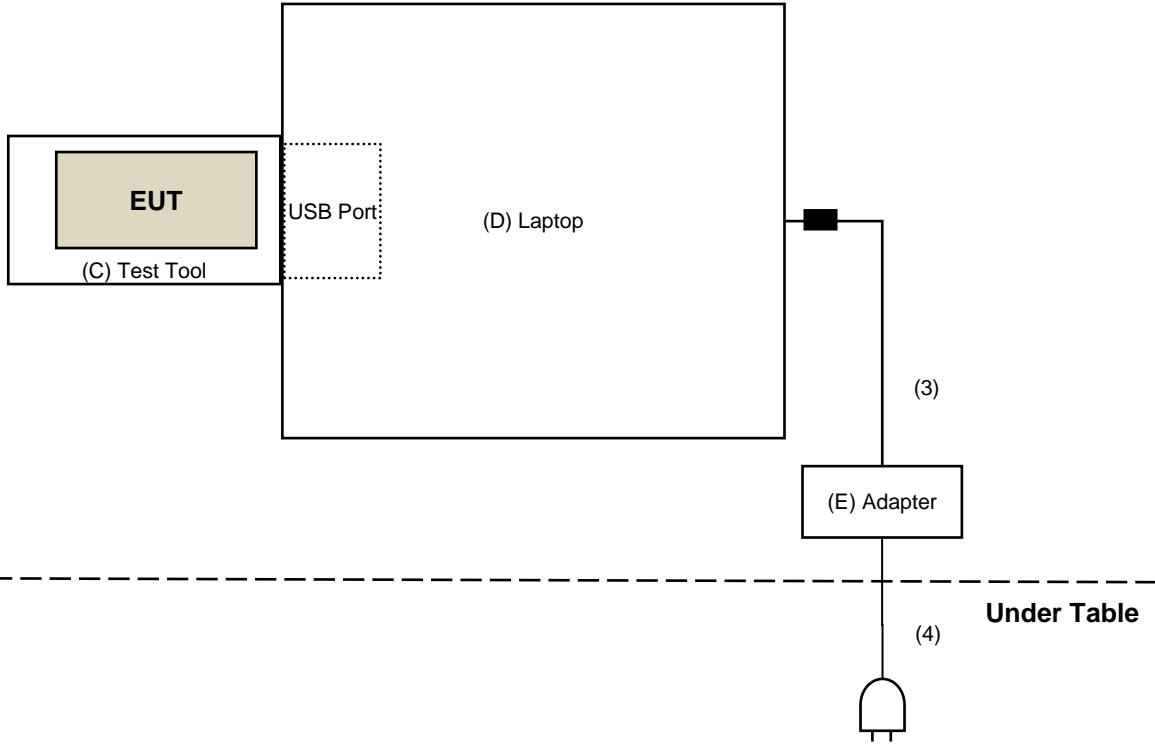
- All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	2	No	1	Provided by Lab
2.	AC Cable	1	2	No	0	Provided by Lab
3.	DC Cable	1	2.5	No	1	Provided by Lab
4.	AC Cable	1	1.5	No	0	Provided by Lab

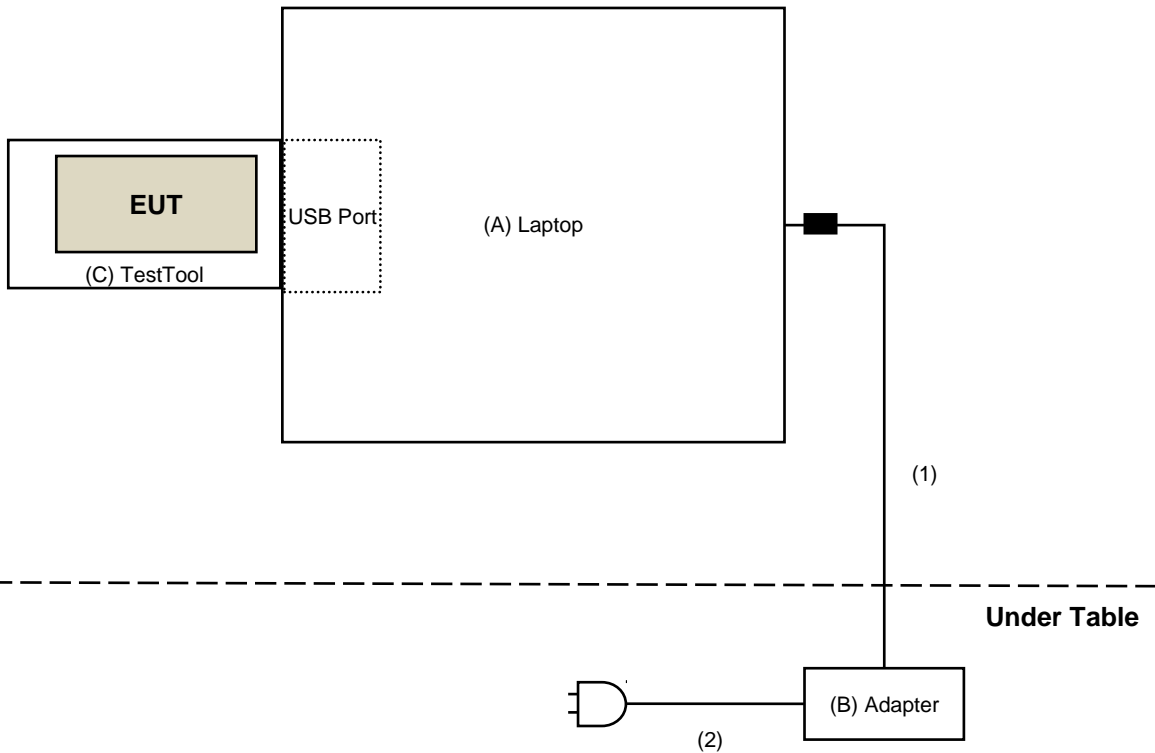
Note: The cores are originally attached to the cables.

### 3.4.1 Configuration of System under Test

For Conducted emission test:



For other test items:



### 3.5 General Description of Applied Standards and references

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

**Test standard:**

**FCC Part 15, Subpart C (15.247)**

**ANSI C63.10-2013**

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

**References Test Guidance:**

**KDB 558074 D01 15.247 Meas Guidance v05r02**

All test items have been performed as a reference to the above KDB test guidance.

## 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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 23, 2019	Oct. 22, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 15, 2019	Aug. 14, 2020
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020

**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 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Nov. 27 to Dec. 10, 2019

#### 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 detects 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.

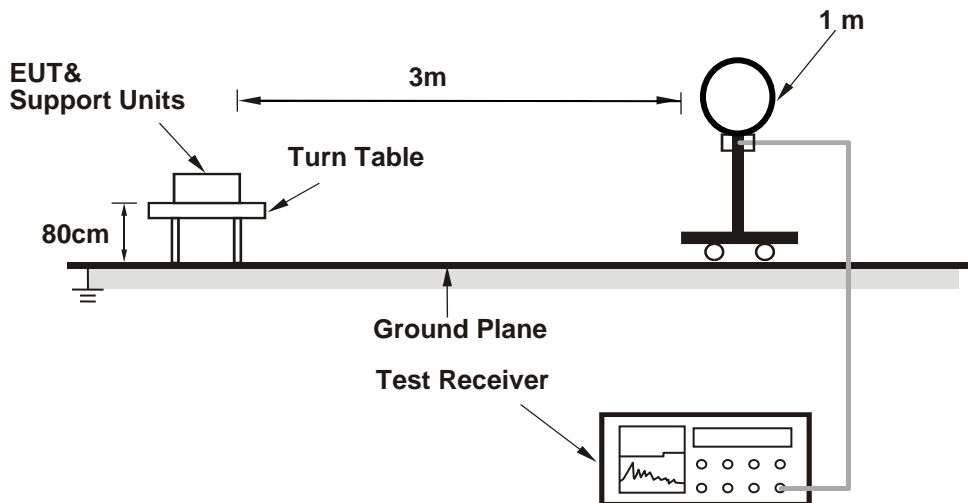
#### 4.1.4 Deviation from Test Standard

No deviation.

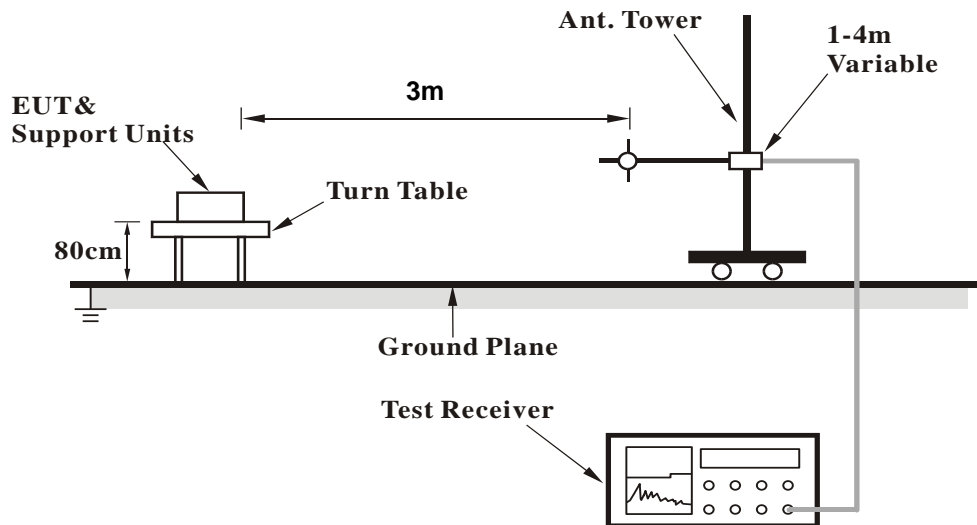


#### 4.1.5 Test Setup

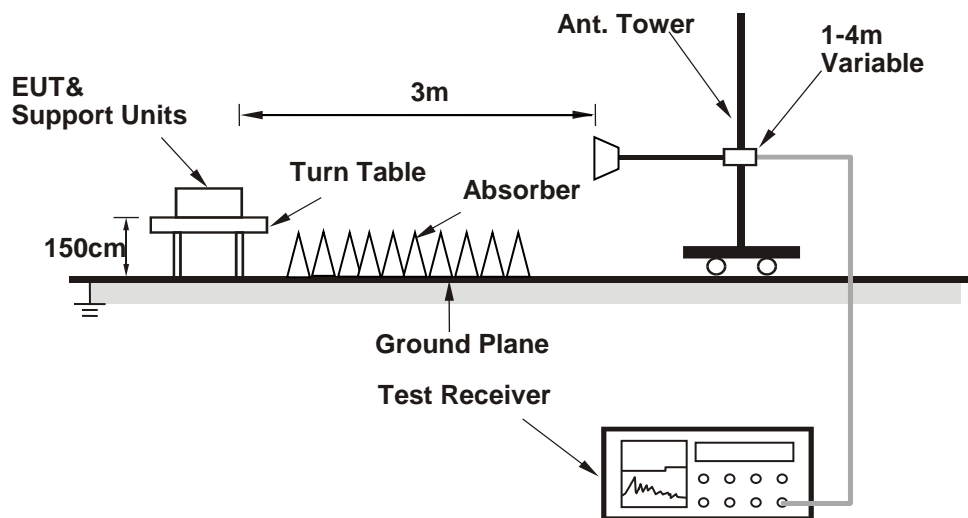
##### For Radiated emission below 30MHz



##### 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. Placed the EUT on the testing table.
- b. Controlling software (Hyper terminal paste command RG-1008M SOP) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

##### Above 1GHz Data:

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	2769.90	55.5 PK	74.0	-18.5	1.48 H	95	56.8	-1.3
2	2769.90	50.6 AV	54.0	-3.4	1.48 H	95	51.9	-1.3
3	3693.20	55.8 PK	74.0	-18.2	1.88 H	23	55.9	-0.1
4	3693.20	48.9 AV	54.0	-5.1	1.88 H	23	49.0	-0.1
5	7386.40	55.4 PK	74.0	-18.6	1.27 H	347	46.1	9.3
6	7386.40	44.3 AV	54.0	-9.7	1.27 H	347	35.0	9.3

##### 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	2769.90	55.2 PK	74.0	-18.8	2.62 V	269	56.5	-1.3
2	2769.90	50.6 AV	54.0	-3.4	2.62 V	269	51.9	-1.3
3	3693.20	58.0 PK	74.0	-16.0	1.94 V	268	58.1	-0.1
4	3693.20	51.4 AV	54.0	-2.6	1.94 V	268	51.5	-0.1
5	7386.40	55.9 PK	74.0	-18.1	1.33 V	164	46.6	9.3
6	7386.40	48.6 AV	54.0	-5.4	1.33 V	164	39.3	9.3

##### 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 other emission levels were very low against the limit.

<b>CHANNEL</b>	TX Channel 4	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	2775.30	55.2 PK	74.0	-18.8	1.54 H	101	56.5	-1.3
2	2775.30	50.3 AV	54.0	-3.7	1.54 H	101	51.6	-1.3
3	3700.40	55.7 PK	74.0	-18.3	1.92 H	33	55.8	-0.1
4	3700.40	48.9 AV	54.0	-5.1	1.92 H	33	49.0	-0.1
5	7400.80	55.1 PK	74.0	-18.9	1.25 H	338	45.7	9.4
6	7400.80	43.9 AV	54.0	-10.1	1.25 H	338	34.5	9.4

**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	2775.30	55.8 PK	74.0	-18.2	2.67 V	281	57.1	-1.3
2	2775.30	51.0 AV	54.0	-3.0	2.67 V	281	52.3	-1.3
3	3700.40	58.8 PK	74.0	-15.2	1.94 V	280	58.9	-0.1
<b>4</b>	<b>3700.40</b>	<b>51.9 AV</b>	<b>54.0</b>	<b>-2.1</b>	<b>1.94 V</b>	<b>280</b>	<b>52.0</b>	<b>-0.1</b>
5	7400.80	55.6 PK	74.0	-18.4	1.27 V	151	46.2	9.4
6	7400.80	44.4 AV	54.0	-9.6	1.27 V	151	35.0	9.4

**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 other emission levels were very low against the limit.

<b>CHANNEL</b>	TX Channel 8	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	2782.50	51.7 PK	74.0	-22.3	1.37 H	358	53.0	-1.3
2	2782.50	46.7 AV	54.0	-7.3	1.37 H	358	48.0	-1.3
3	3710.00	56.7 PK	74.0	-17.3	1.87 H	23	56.8	-0.1
4	3710.00	50.1 AV	54.0	-3.9	1.87 H	23	50.2	-0.1
5	7420.00	53.7 PK	74.0	-20.3	1.09 H	360	44.3	9.4
6	7420.00	43.2 AV	54.0	-10.8	1.09 H	360	33.8	9.4

**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	2782.50	49.6 PK	74.0	-24.4	2.29 V	162	50.9	-1.3
2	2782.50	44.6 AV	54.0	-9.4	2.29 V	162	45.9	-1.3
3	3710.00	56.3 PK	74.0	-17.7	2.30 V	268	56.4	-0.1
4	3710.00	49.7 AV	54.0	-4.3	2.30 V	268	49.8	-0.1
5	7420.00	50.2 PK	74.0	-23.8	1.53 V	272	40.8	9.4
6	7420.00	42.5 AV	54.0	-11.5	1.53 V	272	33.1	9.4

**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 other emission levels were very low against the limit.

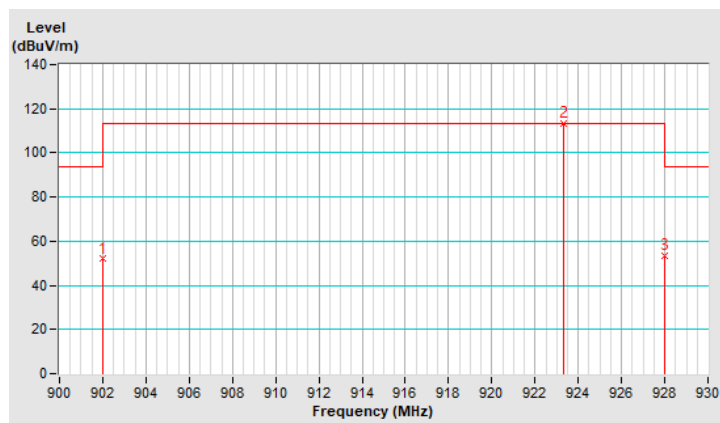
**Below 1GHz Data:**

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	900MHz ~ 930MHz		

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	52.2 QP	93.5	-41.3	1.45 H	360	19.8	32.4
2	*923.30	113.5 QP			1.45 H	360	80.4	33.1
3	928.00	53.5 QP	93.5	-40.0	1.45 H	80	20.3	33.2

**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.



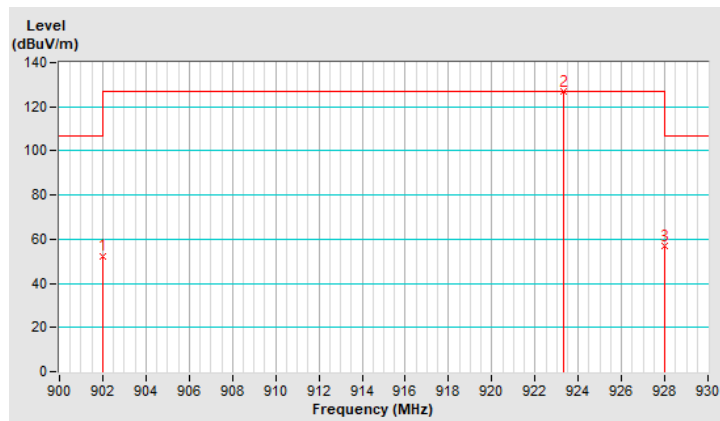
<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	900MHz ~ 930MHz		

**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	52.5 QP	106.7	-54.2	1.51 V	55	20.1	32.4
2	*923.30	126.7 QP			1.51 V	55	93.6	33.1
3	928.00	56.8 QP	106.7	-49.9	1.51 V	55	23.6	33.2

**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.



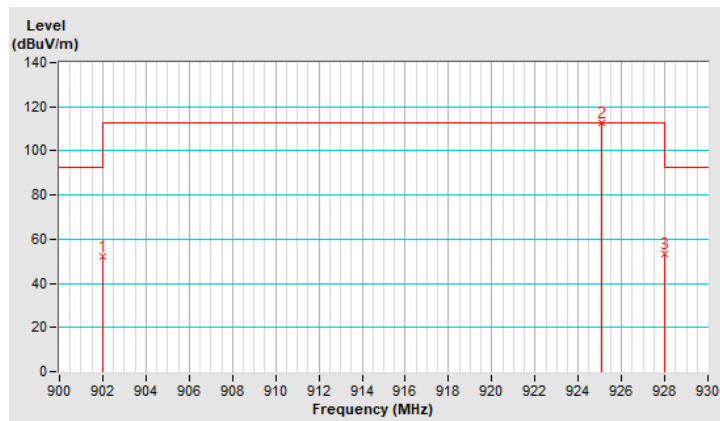
<b>CHANNEL</b>	TX Channel 4	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	900MHz ~ 930MHz		

**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	52.1 QP	92.5	-40.4	1.35 H	350	19.7	32.4
2	*925.10	112.5 QP			1.35 H	350	79.3	33.2
3	928.00	53.4 QP	92.5	-39.1	1.35 H	350	20.2	33.2

**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.





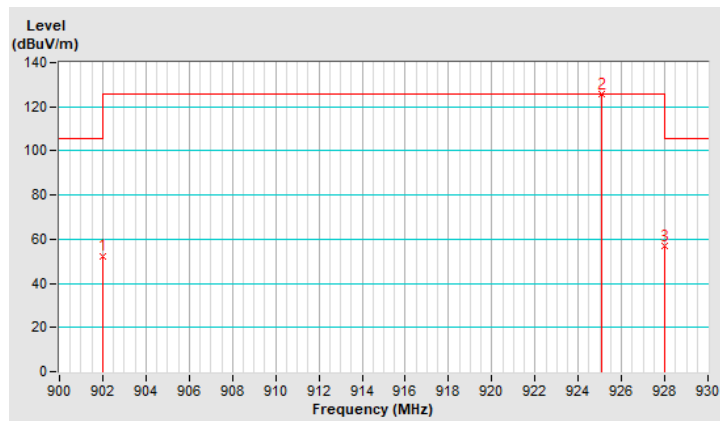
<b>CHANNEL</b>	TX Channel 4	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	900MHz ~ 930MHz		

**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	52.4 QP	105.7	-53.3	1.41 V	45	20.0	32.4
2	*925.10	125.7 QP			1.41 V	45	92.5	33.2
3	928.00	56.7 QP	105.7	-49.0	1.41 V	45	23.5	33.2

**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.



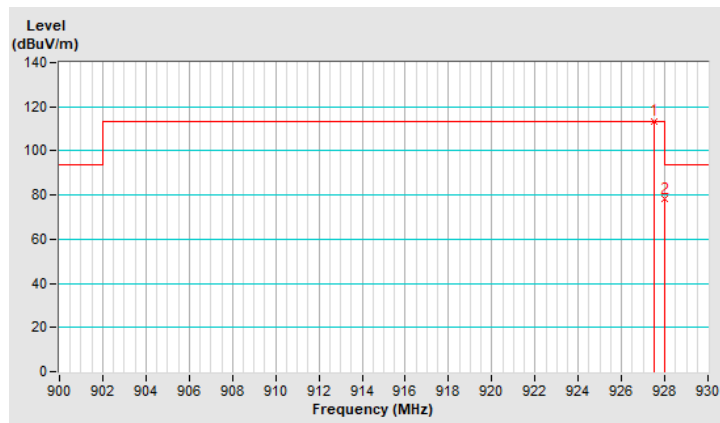
<b>CHANNEL</b>	TX Channel 8	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	900MHz ~ 930MHz		

**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	*927.50	113.6 QP			1.45 H	360	80.4	33.2
2	928.00	78.3 QP	93.6	-15.3	1.45 H	80	45.1	33.2

**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.



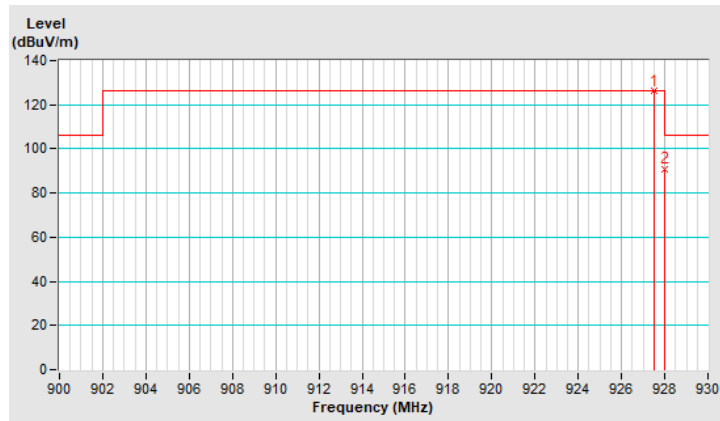
<b>CHANNEL</b>	TX Channel 8	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	900MHz ~ 930MHz		

**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	*927.50	126.2 QP			1.53 V	50	93.0	33.2
2	928.00	91.0 QP	106.2	-15.2	1.53 V	50	57.8	33.2

**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.

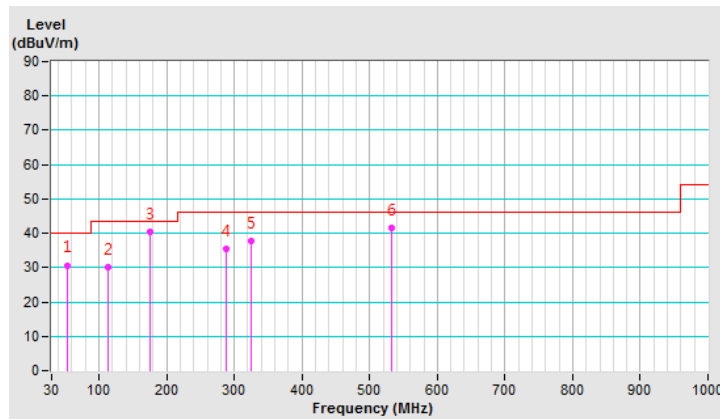


<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

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	52.50	30.7 QP	40.0	-9.3	1.00 H	163	38.6	-7.9
2	113.13	30.1 QP	43.5	-13.4	3.00 H	360	40.5	-10.4
3	174.87	40.3 QP	43.5	-3.2	2.00 H	264	49.0	-8.7
4	287.87	35.4 QP	46.0	-10.6	1.00 H	297	42.5	-7.1
5	323.93	37.6 QP	46.0	-8.4	3.00 H	280	43.6	-6.0
6	532.00	41.6 QP	46.0	-4.4	2.00 H	342	42.6	-1.0

**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 other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.



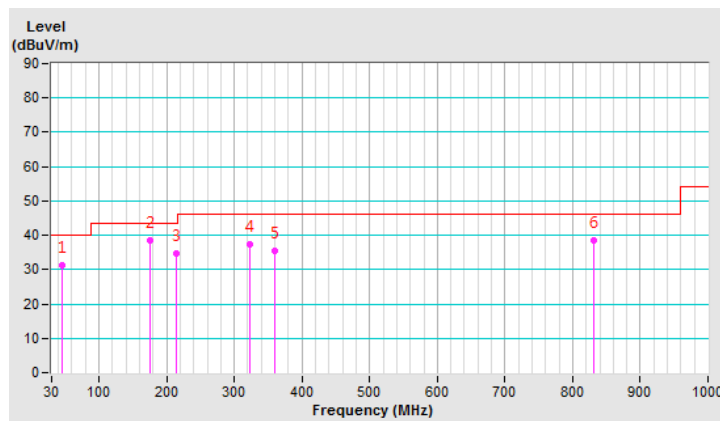
<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

**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	45.91	31.4 QP	40.0	-8.6	3.00 V	64	39.3	-7.9
2	175.40	38.6 QP	43.5	-4.9	2.00 V	115	47.4	-8.8
3	215.17	34.6 QP	43.5	-8.9	1.00 V	34	45.6	-11.0
4	323.23	37.3 QP	46.0	-8.7	2.00 V	346	43.3	-6.0
5	359.24	35.3 QP	46.0	-10.7	2.00 V	328	40.7	-5.4
6	832.02	38.4 QP	46.0	-7.6	1.00 V	132	33.4	5.0

**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 other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.



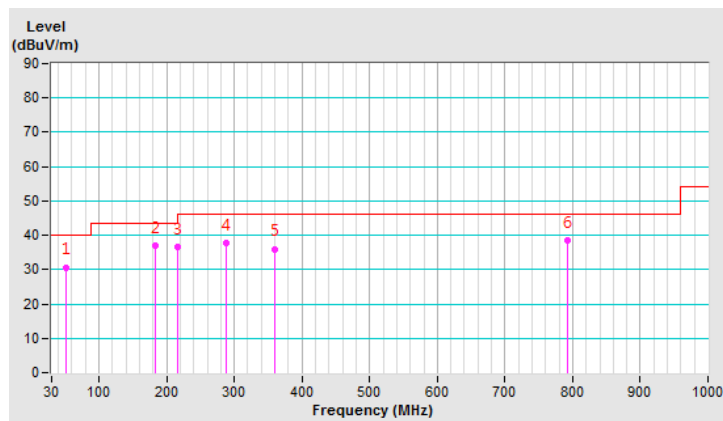
<b>CHANNEL</b>	TX Channel 4	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

**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	51.10	30.7 QP	40.0	-9.3	1.00 H	0	38.6	-7.9
2	183.55	37.0 QP	43.5	-6.5	2.00 H	242	46.8	-9.8
3	215.88	36.7 QP	43.5	-6.8	1.00 H	287	47.7	-11.0
4	287.61	37.7 QP	46.0	-8.3	1.00 H	211	44.8	-7.1
5	359.82	36.0 QP	46.0	-10.0	2.00 H	317	41.4	-5.4
6	791.89	38.4 QP	46.0	-7.6	2.00 H	272	33.9	4.5

**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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.



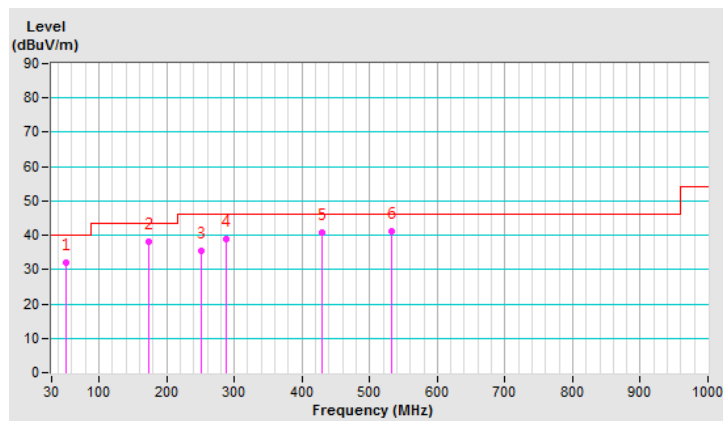
<b>CHANNEL</b>	TX Channel 4	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

**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	51.85	31.9 QP	40.0	-8.1	1.00 V	139	39.8	-7.9
2	174.34	38.1 QP	43.5	-5.4	2.00 V	121	46.7	-8.6
3	251.18	35.5 QP	46.0	-10.5	2.00 V	233	44.3	-8.8
4	287.90	38.8 QP	46.0	-7.2	2.00 V	138	45.9	-7.1
5	430.27	40.8 QP	46.0	-5.2	1.00 V	240	44.0	-3.2
6	531.98	41.0 QP	46.0	-5.0	2.00 V	311	42.0	-1.0

**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 other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.



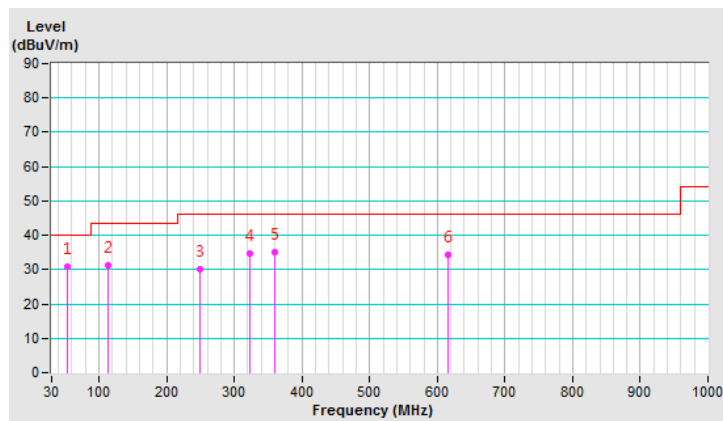
<b>CHANNEL</b>	TX Channel 8	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

**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	53.89	31.0 QP	40.0	-9.0	1.00 H	196	39.0	-8.0
2	112.79	31.4 QP	43.5	-12.1	2.00 H	0	41.8	-10.4
3	250.00	30.2 QP	46.0	-15.8	1.00 H	327	38.9	-8.7
4	323.84	34.6 QP	46.0	-11.4	1.00 H	289	40.6	-6.0
5	359.85	34.9 QP	46.0	-11.1	1.00 H	291	40.3	-5.4
6	615.71	34.4 QP	46.0	-11.6	2.00 H	0	33.0	1.4

**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 other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.





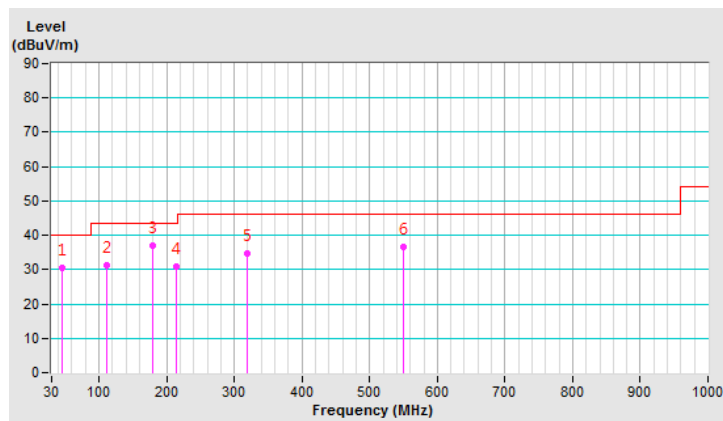
<b>CHANNEL</b>	TX Channel 8	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 1GHz		

**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	44.77	30.4 QP	40.0	-9.6	4.00 V	184	38.3	-7.9
2	111.77	31.1 QP	43.5	-12.4	1.00 V	173	41.6	-10.5
3	179.72	37.0 QP	43.5	-6.5	2.00 V	105	46.3	-9.3
4	215.12	30.8 QP	43.5	-12.7	1.00 V	13	41.8	-11.0
5	320.01	34.7 QP	46.0	-11.3	1.00 V	0	40.8	-6.1
6	550.02	36.7 QP	46.0	-9.3	1.00 V	280	37.3	-0.6

**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 other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3. Tested Date: Dec. 02, 2019

#### 4.2.3 Test Procedures

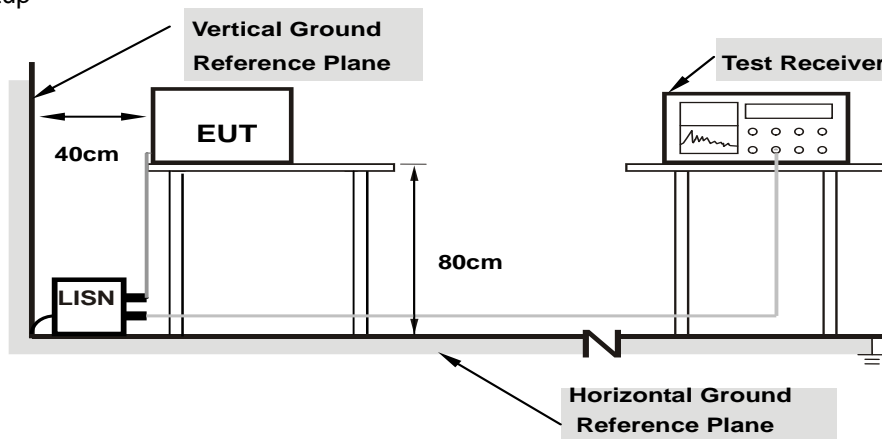
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6

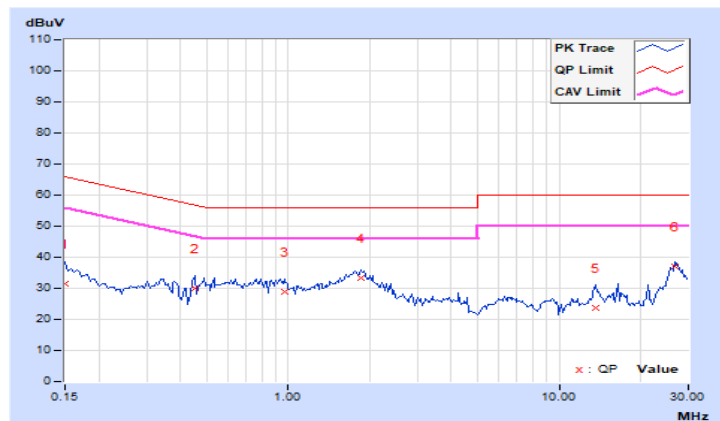
#### 4.2.7 Test Results

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.97	21.58	16.86	31.55	26.83	66.00	56.00	-34.45	-29.17
2	0.45078	9.98	19.96	7.40	29.94	17.38	56.86	46.86	-26.92	-29.48
3	0.97031	10.02	18.73	15.22	28.75	25.24	56.00	46.00	-27.25	-20.76
4	1.85156	10.06	23.26	19.62	33.32	29.68	56.00	46.00	-22.68	-16.32
5	13.68359	10.69	12.94	6.95	23.63	17.64	60.00	50.00	-36.37	-32.36
6	26.75781	11.24	25.74	20.74	36.98	31.98	60.00	50.00	-23.02	-18.02

#### 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

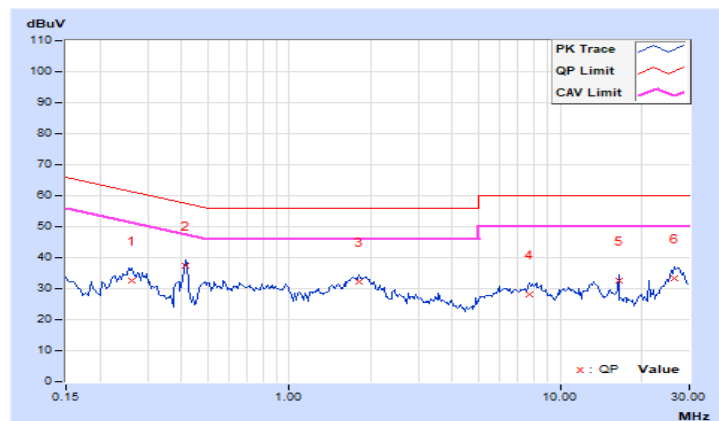


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.26328	9.97	22.55	16.77	32.52	26.74	61.33	51.33	-28.81	-24.59
<b>2</b>	<b>0.41563</b>	<b>9.98</b>	<b>27.59</b>	<b>27.23</b>	<b>37.57</b>	<b>37.21</b>	<b>57.54</b>	<b>47.54</b>	<b>-19.97</b>	<b>-10.33</b>
3	1.80078	10.05	22.29	18.72	32.34	28.77	56.00	46.00	-23.66	-17.23
4	7.66016	10.29	17.76	10.95	28.05	21.24	60.00	50.00	-31.95	-28.76
5	16.46484	10.66	21.93	20.82	32.59	31.48	60.00	50.00	-27.41	-18.52
6	26.58594	10.91	22.26	17.21	33.17	28.12	60.00	50.00	-26.83	-21.88

**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

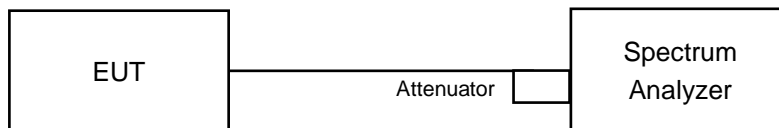


### 4.3 6dB Bandwidth Measurement

#### 4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 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. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

#### 4.3.5 Deviation from Test Standard

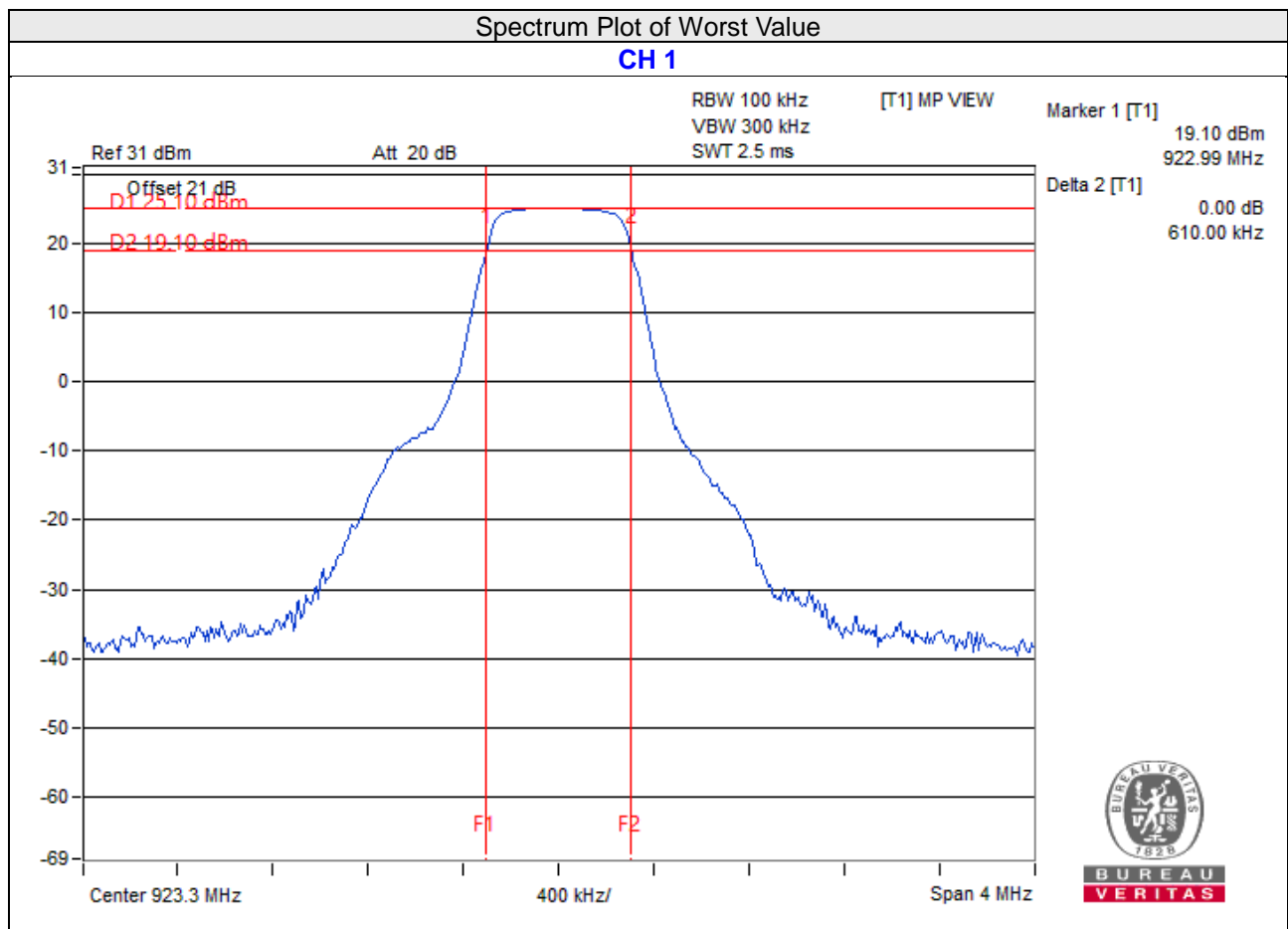
No deviation.

#### 4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 4.3.7 Test Results

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	923.3	0.61	0.5	Pass
4	925.1	0.61	0.5	Pass
8	927.5	0.61	0.5	Pass

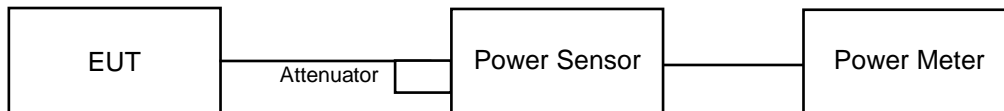


## 4.4 Conducted Output Power Measurement

### 4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 902-928 MHz bands: 1 Watt (30dBm)

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

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

### 4.4.5 Deviation from Test Standard

No deviation.

### 4.4.6 EUT Operating Conditions

Same as Item 4.3.6.



**FOR PEAK POWER**

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	923.3	320.627	25.06	30	Pass
4	925.1	285.759	24.56	30	Pass
8	927.5	295.121	24.70	30	Pass

**FOR AVERAGE POWER**

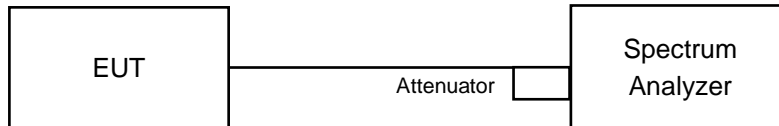
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	923.3	299.916	24.77
4	925.1	267.301	24.27
8	927.5	273.527	24.37

## 4.5 Power Spectral Density Measurement

### 4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 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. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d. Set the VBW  $\geq 3 \times \text{RBW}$ .
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

### 4.5.5 Deviation from Test Standard

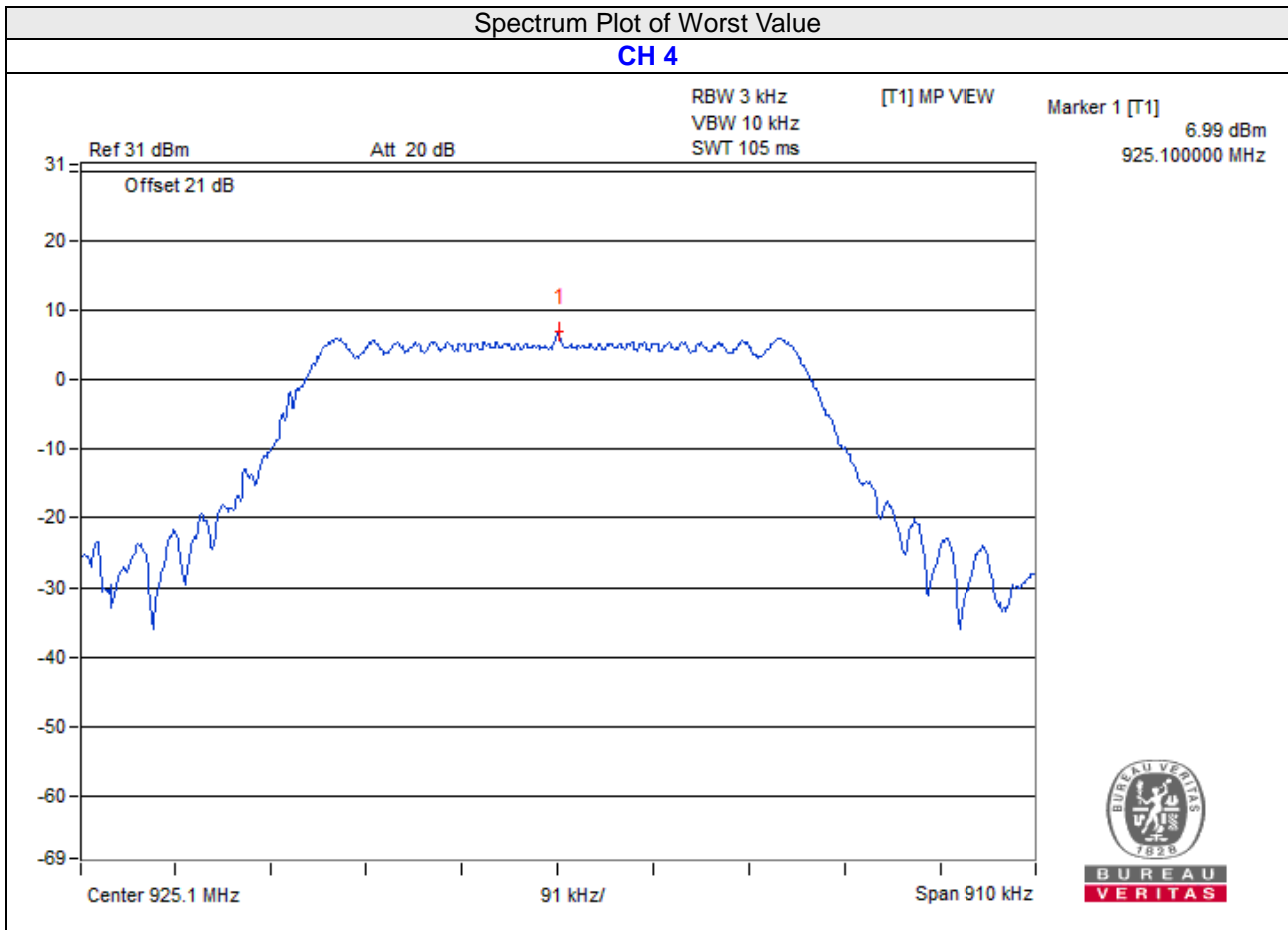
No deviation.

### 4.5.6 EUT Operating Condition

Same as Item 4.3.6.

#### 4.5.7 Test Results

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	923.3	6.68	8	Pass
4	925.1	6.99	8	Pass
8	927.5	6.21	8	Pass

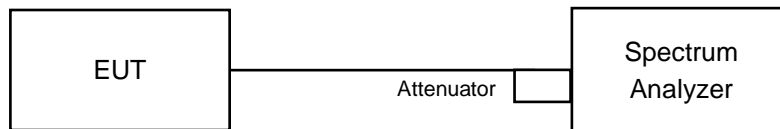


## 4.6 Conducted Out of Band Emission Measurement

### 4.6.1 Limits of Conducted Out of Band Emission Measurement

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

### 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

#### MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

#### MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

### 4.6.5 Deviation from Test Standard

No deviation.

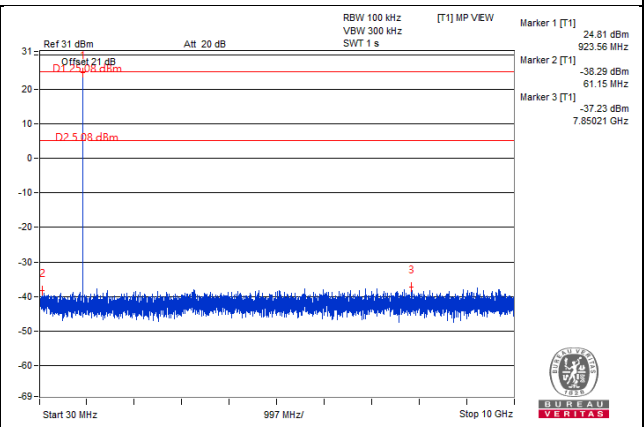
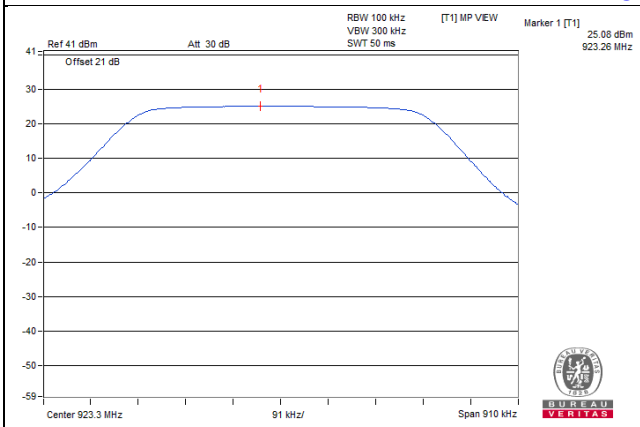
### 4.6.6 EUT Operating Condition

Same as Item 4.3.6.

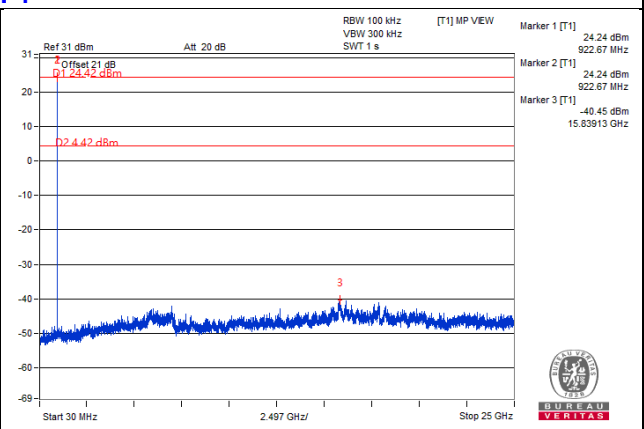
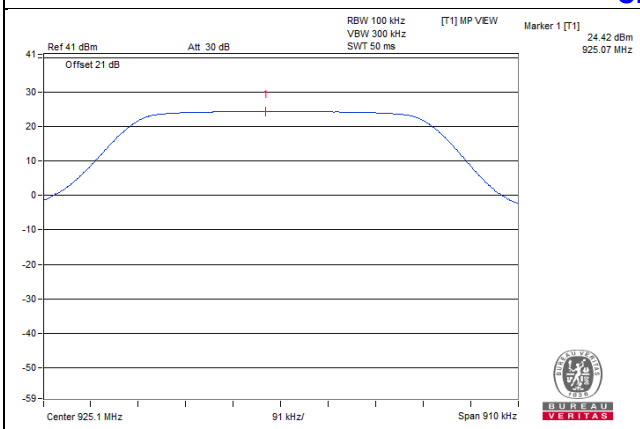
### 4.6.7 Test Results

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

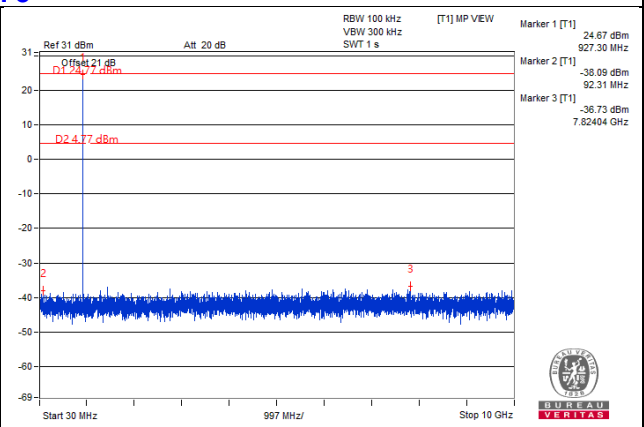
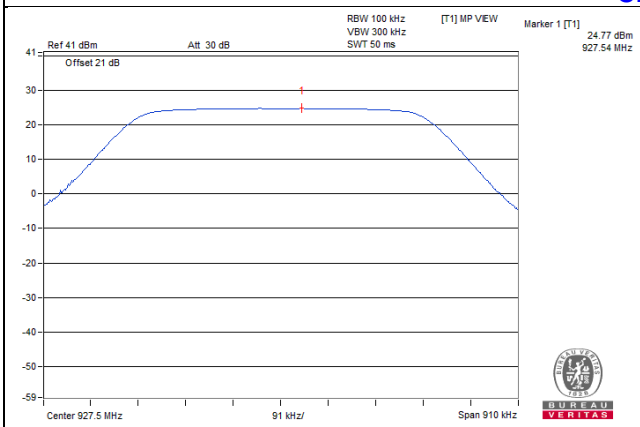
### CH 1



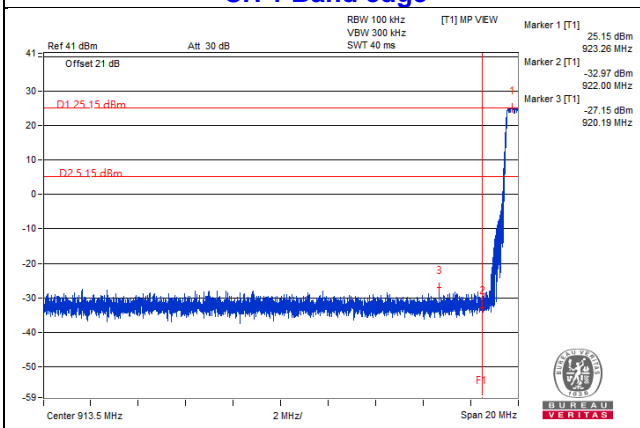
### CH 4



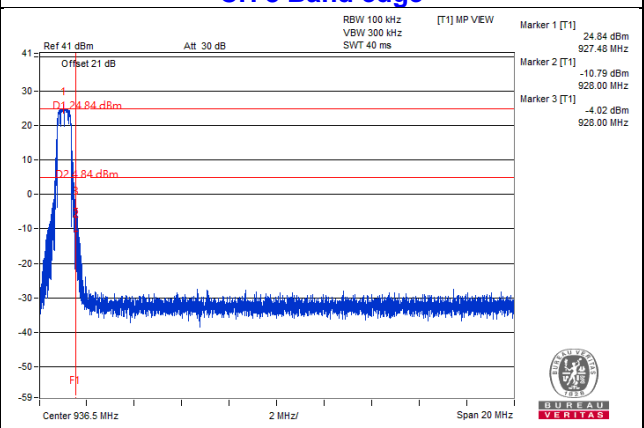
### CH 8



### CH 1 Band edge



### CH 8 Band edge



## 5 Pictures of Test Arrangements

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

## Appendix – Information of 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:

**Lin Kou EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety Lab**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

--- END ---