

## FCC Test Report

**Report No.:** RF171218C14-6

**FCC ID:** NM82Q55200

**Test Model:** 2Q55200

**Received Date:** Dec. 18, 2017

**Test Date:** Jan. 07 ~ Jan. 16, 2018

**Issued Date:** Jan. 26, 2018

**Applicant:** HTC Corporation

**Address:** 88 Section 3, Zhongxing Road, Xindian District, New Taipei City 231, Taiwan

**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 (1):** 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

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

**FCC Registration/  
Designation Number:** 810758 / TW1085



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### Release Control Record

Issue No.	Description	Date Issued
RF171218C14-6	Original release.	Jan. 26, 2018

## 1 Certificate of Conformity

**Product:** Smartphone

**Brand:** HTC

**Test Model:** 2Q55200

**Sample Status:** Production Unit


**Applicant:** HTC Corporation

**Test Date:** Jan. 07 ~ Jan. 16, 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 RF characteristics under the conditions specified in this report.

**Prepared by :**  , **Date:** Jan. 26, 2018  
Pettie Chen / Senior Specialist

**Approved by :**  , **Date:** Jan. 26, 2018  
Dylan Chiou / 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 -29.10dB at 16.36477MHz.
15.247(a)(1)(iii)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1)(iii)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -4.0dB at 62.93MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

**Note:** If The Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.08 dB
	6GHz ~ 18GHz	4.98 dB
	18GHz ~ 40GHz	5.19 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	Smartphone
Brand	HTC
Test Model	2Q55200
Status of EUT	Production Unit
Power Supply Rating	5 Vdc or 9 Vdc or 12 Vdc (adapter) 3.85 Vdc (Li-ion battery)
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	1/2/3Mbps
Operating Frequency	2402 ~ 2480MHz
Number of Channel	79
Output Power	13.397mW
Antenna Type	PIFA antenna with -2.4 dBi gain
Antenna Connector	NA
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. Spurious emission of the simultaneous operation (listed as below) has been evaluated and no non-compliance was found.

No.	Operation Mode
1	GSM+WiFi 2.4GHz
2	GSM+WiFi 5GHz
3	GSM+BT
4	WCDMA+WiFi 2.4GHz
5	WCDMA+WiFi 5GHz
6	WCDMA+BT
7	LTE+WiFi 2.4GHz
8	LTE+WiFi 5GHz
9	LTE+BT
10	WiFi 2.4GHz+BT(WiFi and BT can transmit simultaneously in the different antenna.)
11	WiFi 5GHz+BT(WiFi and BT can transmit simultaneously in the different antenna.)
12	WiFi 2.4GHz+WiFi 5GHz (2.4GHz+5GHz can transmit simultaneously in the different antenna.)
13	WWAN+WiFi 2.4GHz+BT
14	WWAN+WiFi 5GHz+BT

2. The EUT's accessories list refers to Ext. Pho.
3. 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

79 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

### 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

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

#### 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	MODULATION TYPE	PACKET TYPE
-	0 to 78	0, 39, 78	FHSS	GFSK	DH5
-	0 to 78	0, 39, 78	FHSS	8DPSK	DH5

#### 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	MODULATION TYPE	PACKET TYPE
-	0 to 78	78	FHSS	8DPSK	DH5

#### 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	MODULATION TYPE	PACKET TYPE
-	0 to 78	78	FHSS	8DPSK	DH5

### **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	MODULATION TYPE	PACKET TYPE
-	0 to 78	0, 39, 78	FHSS	GFSK	DH5
-	0 to 78	0, 39, 78	FHSS	8DPSK	DH5

### **Test Condition:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	23deg. C, 70%RH	120Vac, 60Hz	Rey Chen
RE<1G	24deg. C, 67%RH	120Vac, 60Hz	Weiwei Lo
PLC	25deg. C, 70%RH	120Vac, 60Hz	Matthew Yang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Ted Chang

### **3.3 Description of Support Units**

The EUT has been tested as an independent unit together with other necessary accessories or support units.

#### **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)**

**FCC Public Notice DA 00-705**

ANSI C63.10-2013

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

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

## 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 Agilent	N9038A	MY50010156	July 12, 2017	July 11, 2018
Loop Antenna <sup>(*)</sup> TESEQ	HLA 6121	45745	May 19, 2017	May 18, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 06, 2017	May 05, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160922 150317 150322	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Spectrum Analyzer Keysight	N9030A	MY54490679	July 25, 2017	July 24, 2018
Pre-Amplifier EMCI	EMC184045SE	980386	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 11, 2017 Jan. 11, 2018	Jan. 10, 2018 Jan. 10, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

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

#### 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. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

##### NOTE:

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

##### For Radiated emission above 30MHz

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

##### Note:

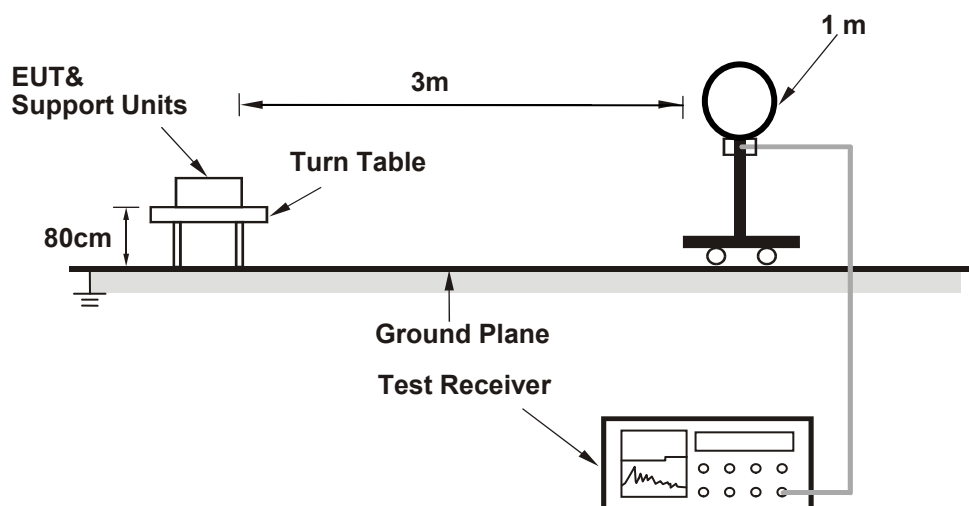
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

#### 4.1.4 Deviation from Test Standard

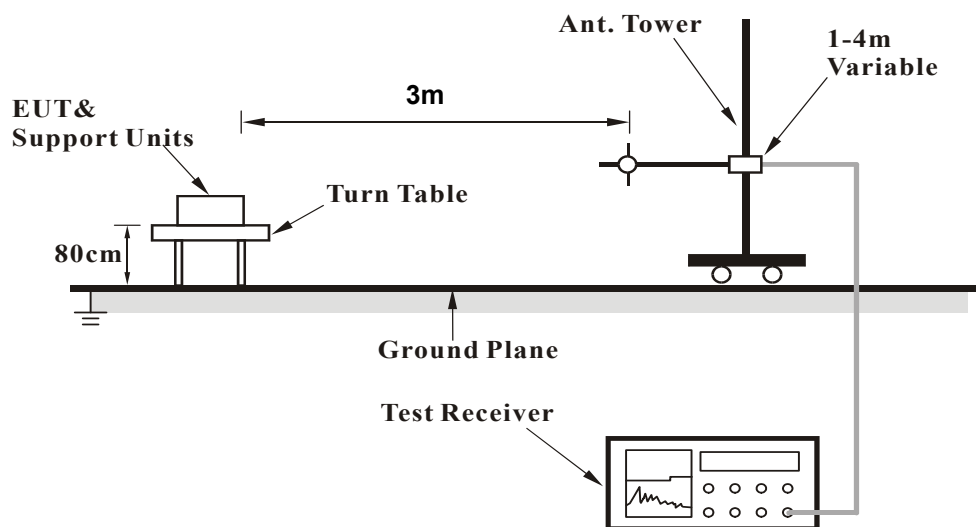
No deviation.

#### 4.1.5 Test Set Up

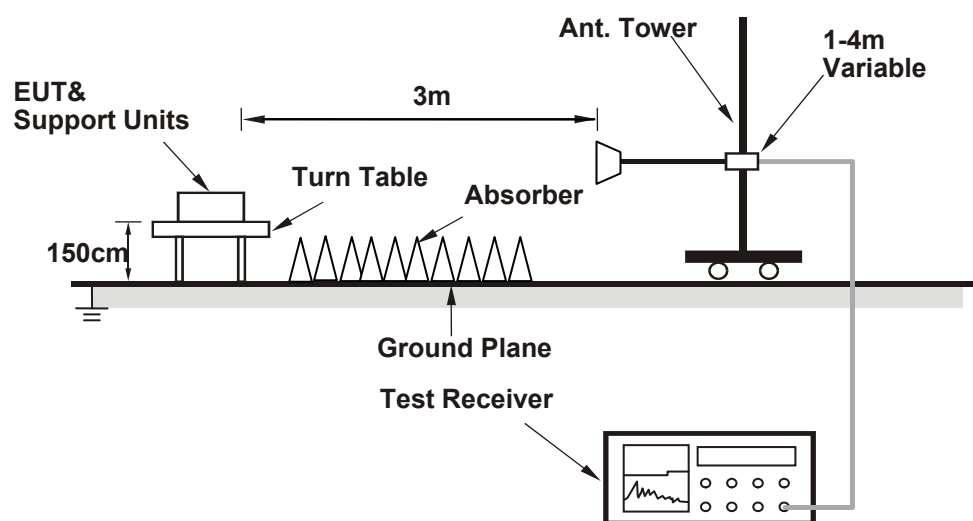
##### For Radiated emission below 30MHz



##### For Radiated emission 30MHz to 1GHz



### For Radiated emission above 1GHz



#### 4.1.6 EUT Operating Conditions

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

#### 4.1.7 Test Results

Above 1GHz Data:

GFSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	56.3 PK	74.0	-17.7	1.22 H	348	57.5	-1.2
2	2390.00	45.6 AV	54.0	-8.4	1.22 H	348	46.8	-1.2
3	*2402.00	101.9 PK			1.22 H	348	103.2	-1.3
4	*2402.00	71.8 AV			1.22 H	348	73.1	-1.3
5	4804.00	37.8 PK	74.0	-36.2	1.63 H	224	34.7	3.1
6	4804.00	7.7 AV	54.0	-46.3	1.63 H	224	4.6	3.1
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	2390.00	55.2 PK	74.0	-18.8	1.24 V	226	56.4	-1.2
2	2390.00	44.1 AV	54.0	-9.9	1.24 V	226	45.3	-1.2
3	*2402.00	90.8 PK			1.24 V	226	92.1	-1.3
4	*2402.00	60.7 AV			1.24 V	226	62.0	-1.3
5	4804.00	37.9 PK	74.0	-36.1	1.93 V	126	34.8	3.1
6	4804.00	7.8 AV	54.0	-46.2	1.93 V	126	4.7	3.1

#### 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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1$  dB
7. Average value = peak reading +  $20\log(\text{duty cycle})$ .

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		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	*2441.00	101.2 PK			1.27 H	353	102.8	-1.6
2	*2441.00	71.1 AV			1.27 H	353	72.7	-1.6
3	4882.00	38.2 PK	74.0	-35.8	1.68 H	220	34.9	3.3
4	4882.00	8.1 AV	54.0	-45.9	1.68 H	220	4.8	3.3
5	7323.00	45.0 PK	74.0	-29.0	1.88 H	76	36.1	8.9
6	7323.00	14.9 AV	54.0	-39.1	1.88 H	76	6.0	8.9
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	*2441.00	90.5 PK			1.29 V	209	92.1	-1.6
2	*2441.00	60.4 AV			1.29 V	209	62.0	-1.6
3	4882.00	38.4 PK	74.0	-35.6	1.89 V	137	35.1	3.3
4	4882.00	8.3 AV	54.0	-45.7	1.89 V	137	5.0	3.3
5	7323.00	43.3 PK	74.0	-30.7	2.01 V	304	34.4	8.9
6	7323.00	13.2 AV	54.0	-40.8	2.01 V	304	4.3	8.9

#### 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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1 \text{ dB}$
7. Average value = peak reading +  $20\log(\text{duty cycle})$ .

<b>CHANNEL</b>	TX Channel 78	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		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	*2480.00	101.6 PK			1.23 H	360	103.1	-1.5
2	*2480.00	71.5 AV			1.23 H	360	73.0	-1.5
3	2483.50	55.1 PK	74.0	-18.9	1.23 H	360	56.6	-1.5
4	2483.50	25.0 AV	54.0	-29.0	1.23 H	360	26.5	-1.5
5	4960.00	38.3 PK	74.0	-35.7	1.72 H	210	35.0	3.3
6	4960.00	8.2 AV	54.0	-45.8	1.72 H	210	4.9	3.3
7	7440.00	45.1 PK	74.0	-28.9	1.90 H	87	36.0	9.1
8	7440.00	15.0 AV	54.0	-39.0	1.90 H	87	5.9	9.1
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	*2480.00	90.5 PK			1.27 V	224	92.0	-1.5
2	*2480.00	60.4 AV			1.27 V	224	61.9	-1.5
3	2483.50	55.2 PK	74.0	-18.8	1.27 V	224	56.7	-1.5
4	2483.50	25.1 AV	54.0	-28.9	1.27 V	224	26.6	-1.5
5	4960.00	38.5 PK	74.0	-35.5	1.89 V	128	35.2	3.3
6	4960.00	8.4 AV	54.0	-45.6	1.89 V	128	5.1	3.3
7	7440.00	43.5 PK	74.0	-30.5	2.05 V	300	34.4	9.1
8	7440.00	13.4 AV	54.0	-40.6	2.05 V	300	4.3	9.1

#### 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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1 \text{ dB}$
7. Average value = peak reading +  $20\log(\text{duty cycle})$ .

# 8DPSK

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		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	2390.00	56.5 PK	74.0	-17.5	1.26 H	334	57.7	-1.2
2	2390.00	45.4 AV	54.0	-8.6	1.26 H	334	46.6	-1.2
3	*2402.00	100.1 PK			1.26 H	334	101.4	-1.3
4	*2402.00	70.0 AV			1.26 H	334	71.3	-1.3
5	4804.00	37.1 PK	74.0	-36.9	1.62 H	188	34.0	3.1
6	4804.00	7.0 AV	54.0	-47.0	1.62 H	188	3.9	3.1
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	2390.00	55.3 PK	74.0	-18.7	1.25 V	219	56.5	-1.2
2	2390.00	44.1 AV	54.0	-9.9	1.25 V	219	45.3	-1.2
3	*2402.00	89.7 PK			1.25 V	219	91.0	-1.3
4	*2402.00	59.6 AV			1.25 V	219	60.9	-1.3
5	4804.00	38.4 PK	74.0	-35.6	1.93 V	143	35.3	3.1
6	4804.00	8.3 AV	54.0	-45.7	1.93 V	143	5.2	3.1

## 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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* " : Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1 \text{ dB}$
7. Average value = peak reading +  $20\log(\text{duty cycle})$ .

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		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	*2441.00	99.7 PK			1.23 H	345	101.3	-1.6
2	*2441.00	69.6 AV			1.23 H	345	71.2	-1.6
3	4882.00	37.3 PK	74.0	-36.7	1.64 H	195	34.0	3.3
4	4882.00	7.2 AV	54.0	-46.8	1.64 H	195	3.9	3.3
5	7323.00	44.9 PK	74.0	-29.1	1.87 H	89	36.0	8.9
6	7323.00	14.8 AV	54.0	-39.2	1.87 H	89	5.9	8.9
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	*2441.00	88.9 PK			1.27 V	227	90.5	-1.6
2	*2441.00	58.8 AV			1.27 V	227	60.4	-1.6
3	4882.00	38.8 PK	74.0	-35.2	1.92 V	126	35.5	3.3
4	4882.00	8.7 AV	54.0	-45.3	1.92 V	126	5.4	3.3
5	7323.00	43.6 PK	74.0	-30.4	2.03 V	303	34.7	8.9
6	7323.00	13.5 AV	54.0	-40.5	2.03 V	303	4.6	8.9

#### 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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1 \text{ dB}$
7. Average value = peak reading +  $20\log(\text{duty cycle})$ .

<b>CHANNEL</b>	TX Channel 78	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		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	*2480.00	99.8 PK			1.26 H	344	101.3	-1.5
2	*2480.00	69.7 AV			1.26 H	344	71.2	-1.5
3	2483.50	55.5 PK	74.0	-18.5	1.26 H	344	57.0	-1.5
4	2483.50	25.4 AV	54.0	-28.6	1.26 H	344	26.9	-1.5
5	4960.00	37.6 PK	74.0	-36.4	1.66 H	204	34.3	3.3
6	4960.00	7.5 AV	54.0	-46.5	1.66 H	204	4.2	3.3
7	7440.00	45.2 PK	74.0	-28.8	1.88 H	100	36.1	9.1
8	7440.00	15.1 AV	54.0	-38.9	1.88 H	100	6.0	9.1
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	*2480.00	88.8 PK			1.33 V	217	90.3	-1.5
2	*2480.00	58.7 AV			1.33 V	217	60.2	-1.5
3	2483.50	55.0 PK	74.0	-19.0	1.33 V	217	56.5	-1.5
4	2483.50	24.9 AV	54.0	-29.1	1.33 V	217	26.4	-1.5
5	4960.00	38.9 PK	74.0	-35.1	1.90 V	134	35.6	3.3
6	4960.00	8.8 AV	54.0	-45.2	1.90 V	134	5.5	3.3
7	7440.00	44.0 PK	74.0	-30.0	2.00 V	308	34.9	9.1
8	7440.00	13.9 AV	54.0	-40.1	2.00 V	308	4.8	9.1

#### 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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " \* ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 \* 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1 \text{ dB}$
7. Average value = peak reading +  $20\log(\text{duty cycle})$ .

Below 1GHz worst-case data:

8DPSK

<b>CHANNEL</b>	TX Channel 78	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	30MHz ~ 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	62.81	31.7 QP	40.0	-8.3	1.50 H	118	40.5	-8.8
2	135.49	38.2 QP	43.5	-5.3	2.00 H	289	46.9	-8.7
3	143.97	33.8 QP	43.5	-9.7	2.00 H	297	42.0	-8.2
4	244.27	31.0 QP	46.0	-15.0	1.00 H	290	40.5	-9.5
5	399.76	26.9 QP	46.0	-19.1	2.00 H	287	31.9	-5.0
6	638.41	29.9 QP	46.0	-16.1	1.00 H	264	29.7	0.2
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	62.93	36.0 QP	40.0	-4.0	1.00 V	245	44.8	-8.8
2	135.49	29.5 QP	43.5	-14.0	1.00 V	312	38.2	-8.7
3	199.63	26.1 QP	43.5	-17.4	2.00 V	359	37.4	-11.3
4	244.27	26.8 QP	46.0	-19.2	2.00 V	274	36.3	-9.5
5	456.12	27.7 QP	46.0	-18.3	1.00 V	225	31.2	-3.5
6	615.71	30.9 QP	46.0	-15.1	2.00 V	102	31.2	-0.3

**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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz.

## 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.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA
Extension Cord	Extension Cord	1-1	Dec. 22, 2017	Dec. 21, 2018

**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

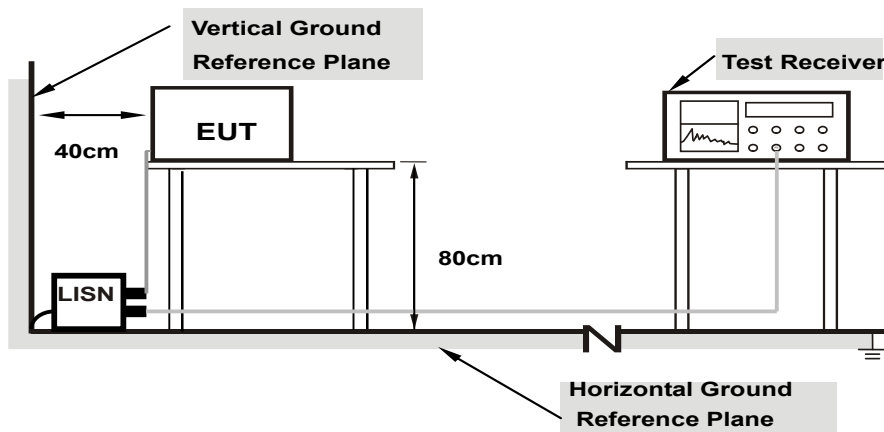
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

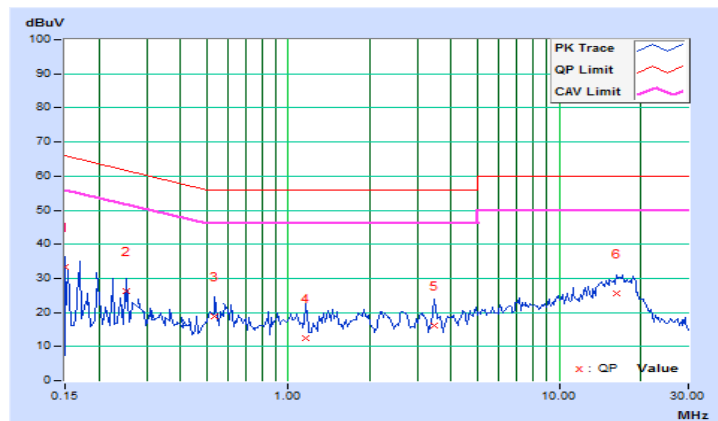
### 8DPSK

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	Channel 78		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.16	23.30	9.27	33.46	19.43	66.00	56.00	-32.54	-36.57
2	0.25166	10.17	15.98	4.84	26.15	15.01	61.70	51.70	-35.55	-36.69
3	0.53318	10.20	8.78	2.75	18.98	12.95	56.00	46.00	-37.02	-33.05
4	1.16269	10.18	2.30	1.96	12.48	12.14	56.00	46.00	-43.52	-33.86
5	3.48132	10.32	5.70	0.24	16.02	10.56	56.00	46.00	-39.98	-35.44
6	16.36477	11.03	14.57	9.87	25.60	20.90	60.00	50.00	-34.40	-29.10

### 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.

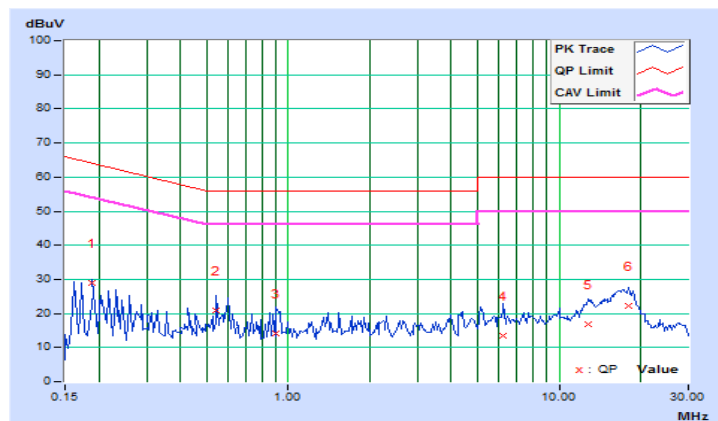


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	Channel 78		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18910	10.16	18.89	5.16	29.05	15.32	64.08	54.08	-35.03	-38.76
2	0.54100	10.20	10.78	0.15	20.98	10.35	56.00	46.00	-35.02	-35.65
3	0.90463	10.20	4.00	3.05	14.20	13.25	56.00	46.00	-41.80	-32.75
4	6.20659	10.43	3.14	2.36	13.57	12.79	60.00	50.00	-46.43	-37.21
5	12.78321	10.70	6.02	0.97	16.72	11.67	60.00	50.00	-43.28	-38.33
6	18.12818	10.94	11.22	5.51	22.16	16.45	60.00	50.00	-37.84	-33.55

#### 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 15 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

- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- 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.
- 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.
- Set the SA on View mode and then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

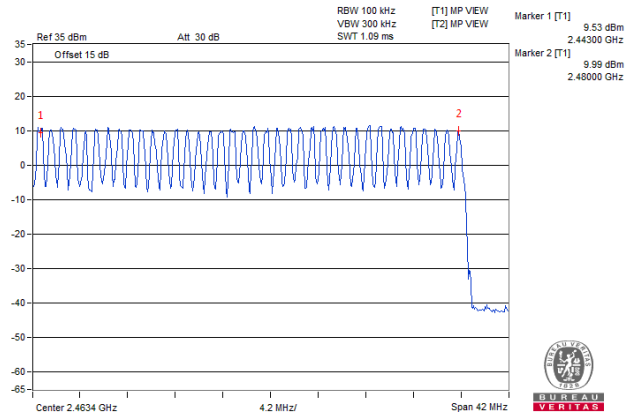
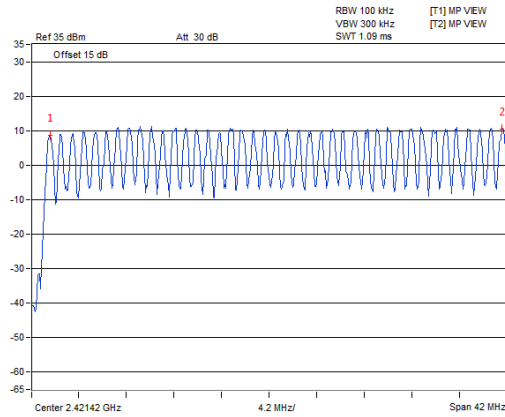
#### 4.3.5 Deviation from Test Standard

No deviation.

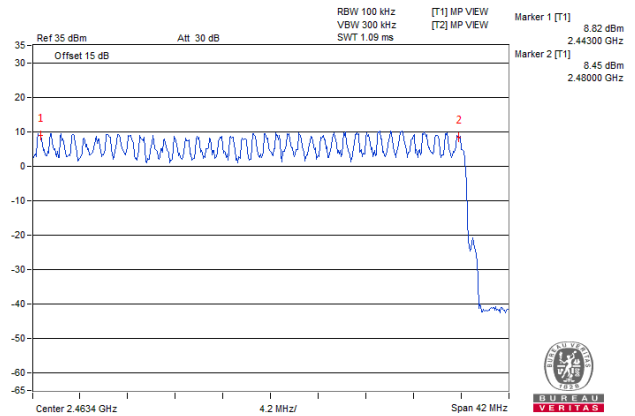
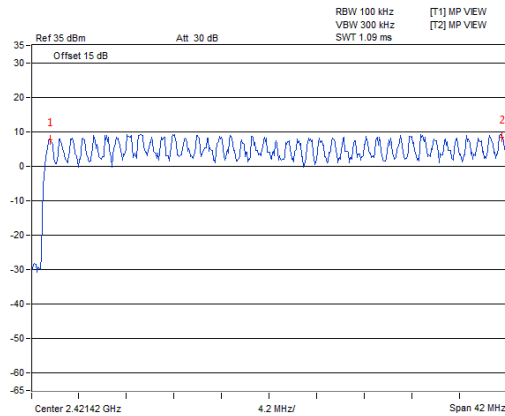
#### 4.3.6 Test Results

There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

## GFSK



## 8DPSK

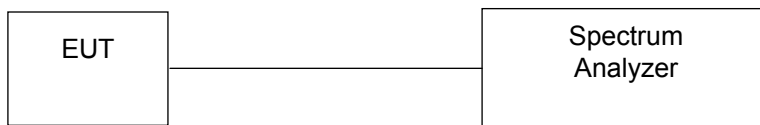


#### 4.4 Dwell Time on Each Channel

##### 4.4.1 Limits of Dwell Time on Each Channel Measurement

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

##### 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

### GFSK

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) * 6.32 = 316.00 times	0.426	134.62	400
DH3	25 (times / 5 sec) * 6.32 = 158.00 times	1.70	268.60	400
DH5	17 (times / 5 sec) * 6.32 = 107.44 times	2.95	316.95	400

Note: Test plots of the transmitting time slot are shown as below.



## 8DPSK

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) * 6.32 = 316.00 times	0.456	144.10	400
DH3	27 (times / 5 sec) * 6.32 = 170.64 times	1.72	293.50	400
DH5	18 (times / 5 sec) * 6.32 = 113.76 times	2.99	340.14	400

Note: Test plots of the transmitting time slot are shown as below.



## 4.5 Channel Bandwidth

### 4.5.1 Limits of Channel Bandwidth Measurement

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

### 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

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.

### 4.5.5 Deviation from Test Standard

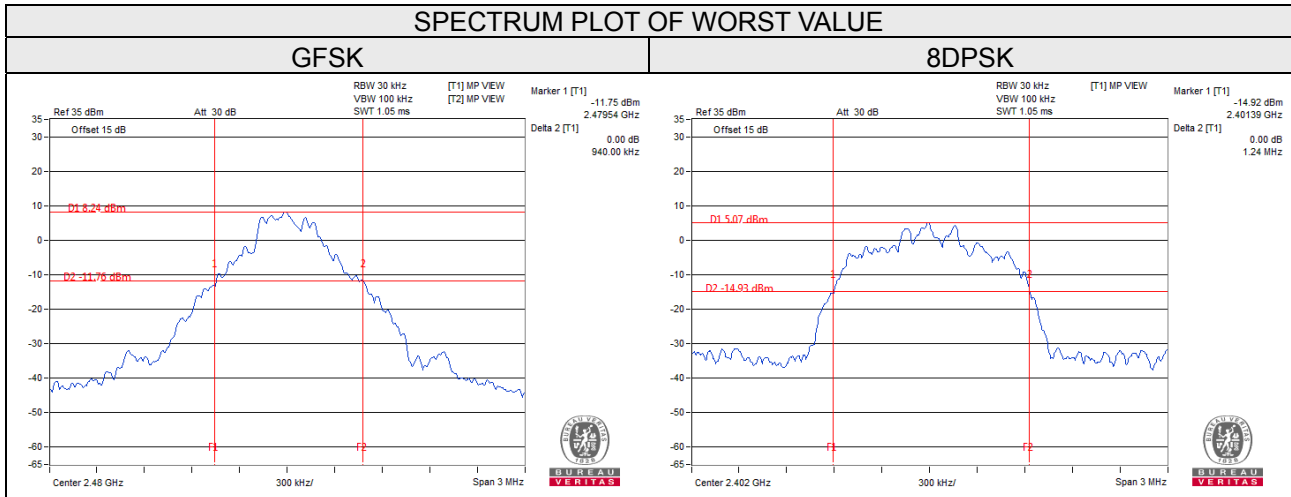
No deviation.

### 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)	
		GFSK	8DPSK
0	2402	0.88	1.24
39	2441	0.94	1.24
78	2480	0.94	1.24



## 4.6 Hopping Channel Separation

### 4.6.1 Limits of Hopping Channel Separation Measurement

At least 25kHz or two-third of 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

Measurement Procedure REF

- 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.

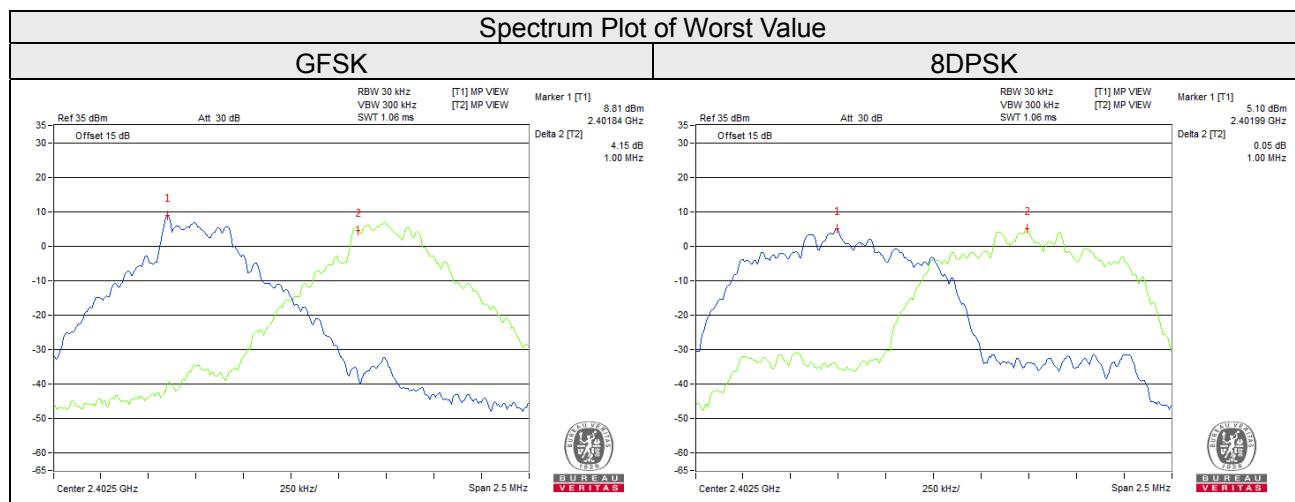
### 4.6.5 Deviation from Test Standard

No deviation.

#### 4.6.6 Test Results

Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)		20dB Bandwidth (MHz)		Minimum Limit (MHz)		Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK	GFSK	8DPSK	
0	2402	1.00	1.00	0.88	1.24	0.59	0.83	Pass
39	2441	1.00	1.00	0.94	1.24	0.63	0.83	Pass
78	2480	1.00	1.00	0.94	1.24	0.63	0.83	Pass

Note: The minimum limit is two-third 20dB bandwidth.



## 4.7 Maximum Output Power

### 4.7.1 Limits of Maximum Output Power Measurement

The Maximum Output Power Measurement is 125mW.

### 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

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3MHz RBW and 10 MHz VBW.
- Measure the captured power within the band and recording the plot.
- Repeat above procedures until all frequencies required were complete.

### 4.7.5 Deviation from Test Standard

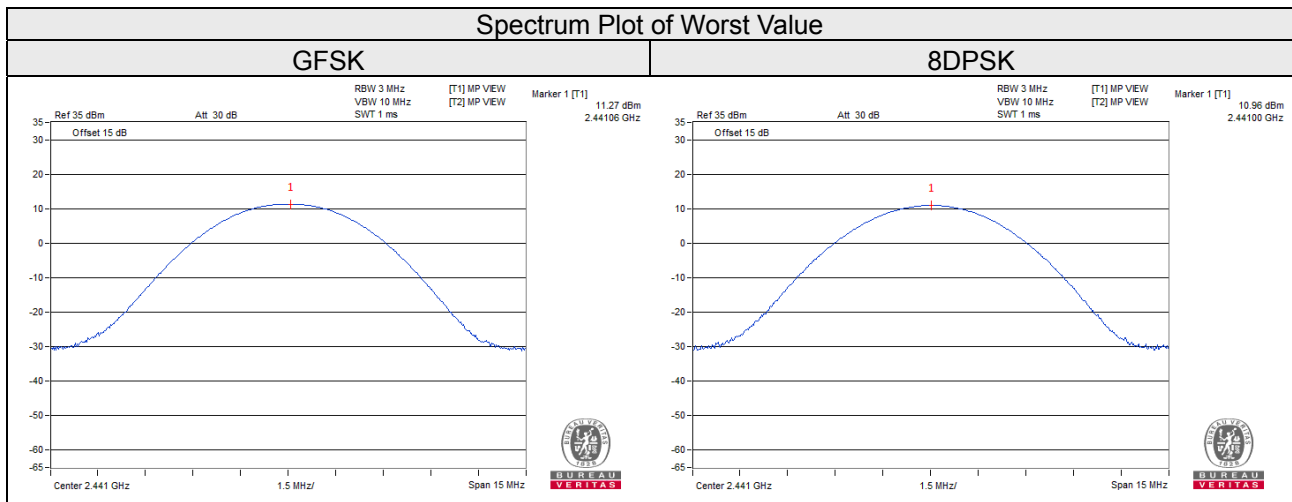
No deviation.

### 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 (mW)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	9.795	9.268	9.91	9.67	125	Pass
39	2441	<b>13.397</b>	12.474	11.27	10.96	125	Pass
78	2480	12.706	12.162	11.04	10.85	125	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**

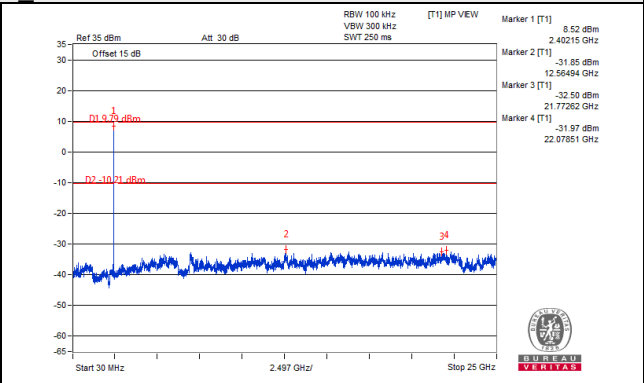
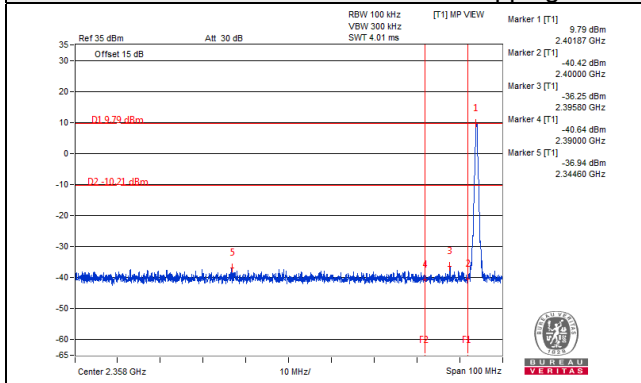
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

##### **4.8.6 Test Results**

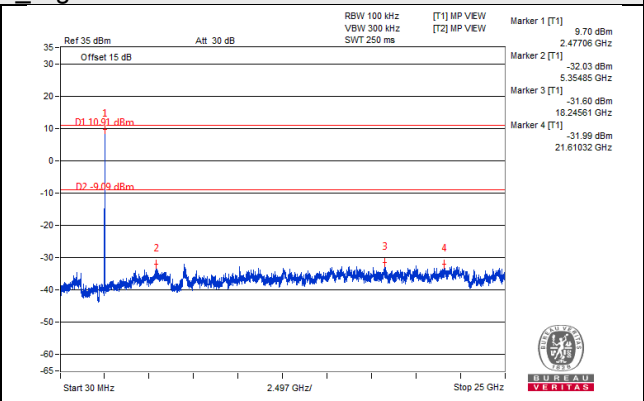
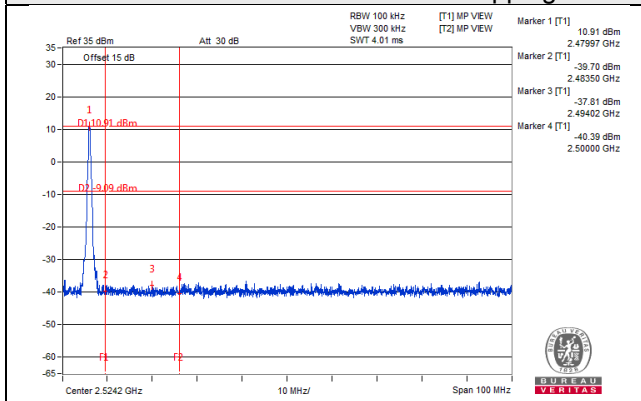
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

## GFSK

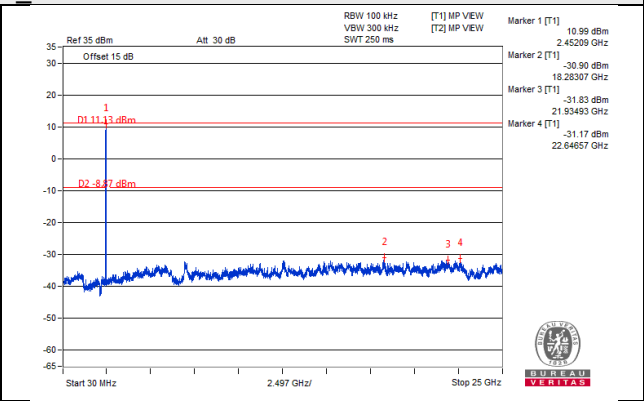
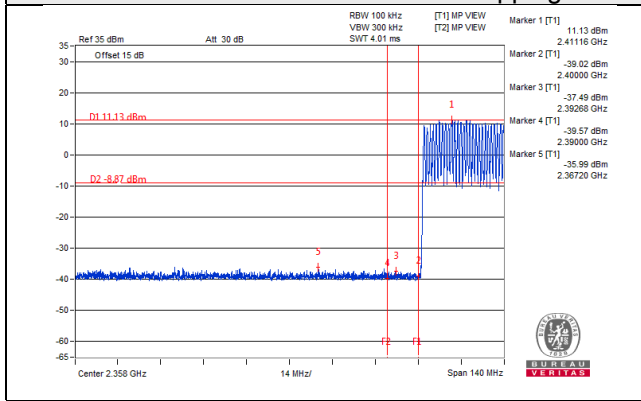
### Hopping disabled Low Channel



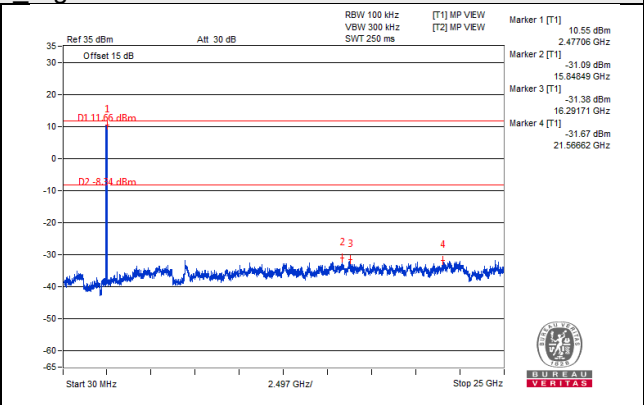
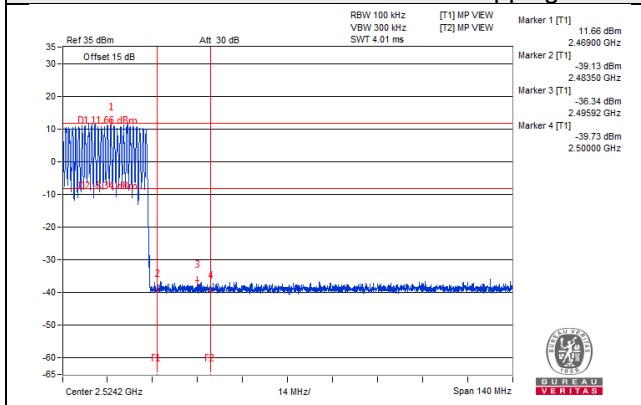
### Hopping disabled High Channel



### Hopping enabled Low Channel

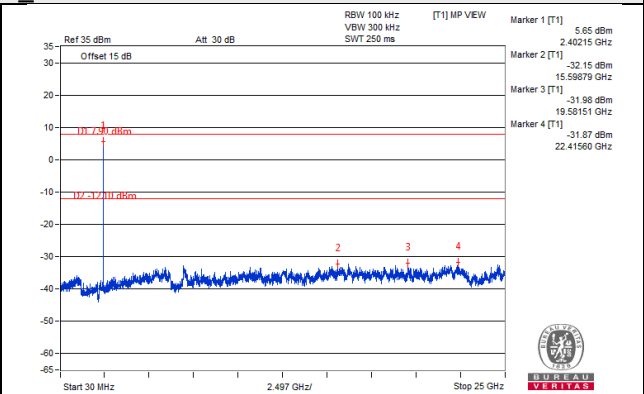
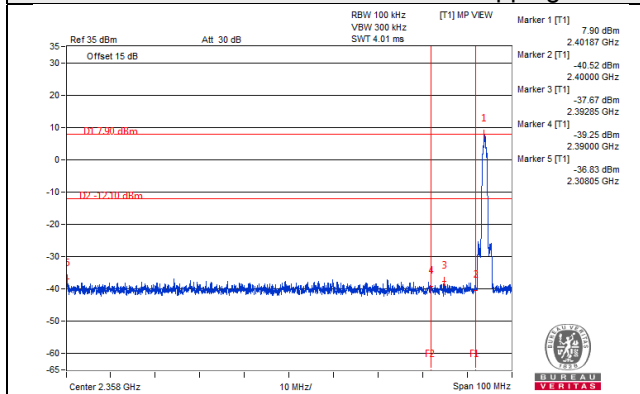


### Hopping enabled High Channel

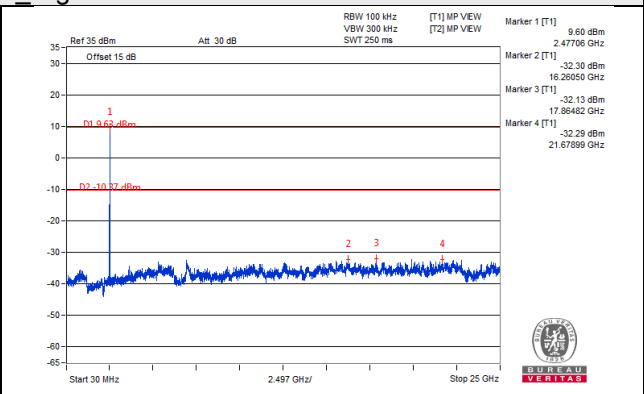
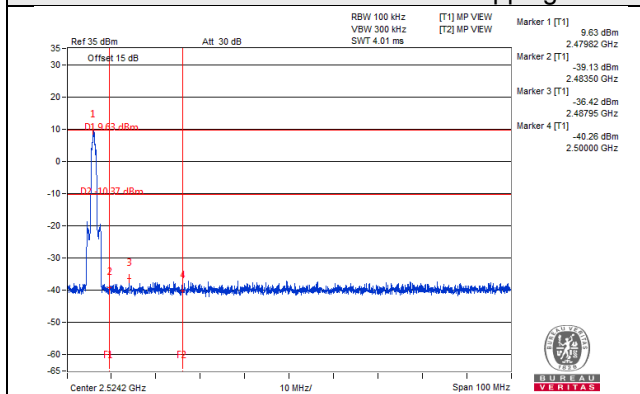


## 8DPSK

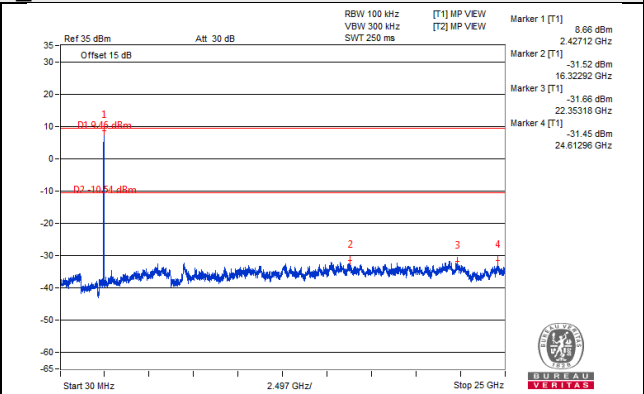
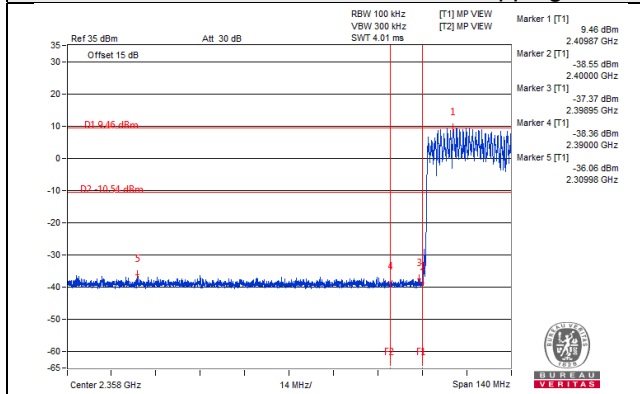
### Hopping disabled\_Low Channel



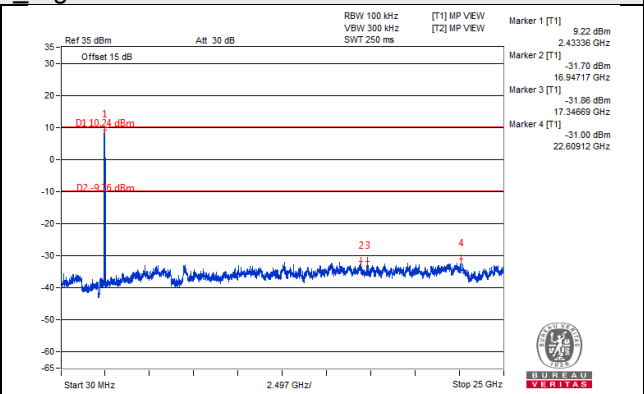
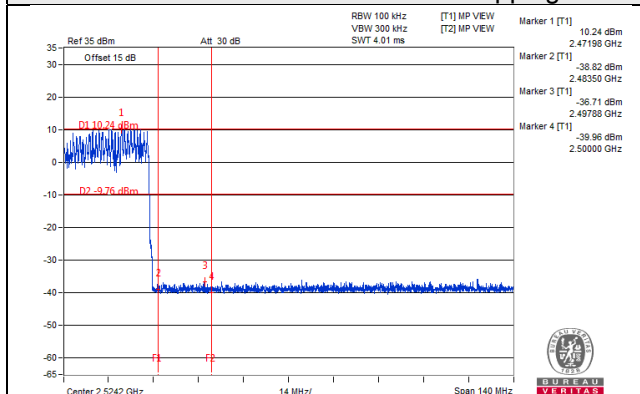
### Hopping disabled\_High Channel



### Hopping enabled\_Low Channel



### Hopping enabled\_High Channel



## 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 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

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**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.

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