FCC Test Report (BT-EDR)

Report No.:	RF180816E04-2
FCC ID:	TX2-RTL8822CE
Test Model:	RTL8822CE
Received Date:	Aug. 16, 2018
Test Date:	Oct. 01 to 22, 2018
Issued Date:	Oct. 25, 2018
Applicant:	Realtek Semiconductor Corp.
Address:	No. 2, Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan
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 R.O.C.
Test Location :	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF180816E04-2	Original release.	Oct. 25, 2018

1 Certificate of Conformity

Product:	802.11a/b/g/n/ac RTL8822CE Combo module
Brand:	Realtek
Test Model:	RTL8822CE
Sample Status:	ENGINEERING SAMPLE
Applicant:	Realtek Semiconductor Corp.
Test Date:	Oct. 01 to 22, 2018
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10: 2013

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

Prepared by : _____ , **Date:** Oct. 25, 2018

Claire Kuan / Specialist

Approved by : _____ , **Date:** Oct. 25, 2018

May Chen / 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 -9.15 dB at 0.18516 MHz.
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 & 209 & 15.247(d)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -6.2 dB at 167.44 MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) not a standard connector.

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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.10 dB
	6GHz ~ 18GHz	4.85 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (BT-EDR)

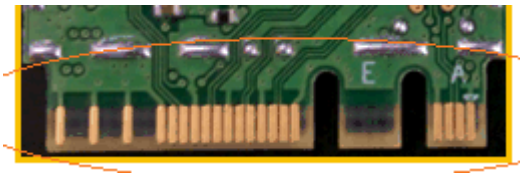
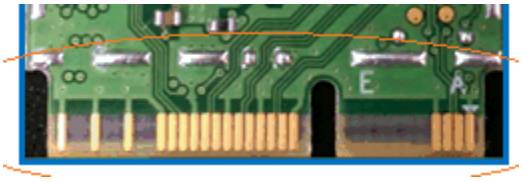
Product	802.11a/b/g/n/ac RTL8822CE Combo module
Brand	Realtek
Test Model	RTL8822CE
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 3.3V from host equipment
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	Up to 3Mbps
Operating Frequency	2402MHz ~ 2480MHz
Number of Channel	79
Output Power	20.137mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. There are WLAN and Bluetooth technology used for the EUT.
2. The EUT has four SKUs, please refer to the following table:

SKU	Ant Port	Interface
A	Tri	PCI-E with A+E key
B	Tri	PCI-E with E key
C	Dual	PCI-E with A+E key
D	Dual	PCI-E with E key
Note: From the above SKUs, SKU: A was selected as representative model for the test and its data was recorded in this report.		

3. The EUT has two interfaces. The main difference is interface, but RF is the same. Please refer to the following table:

Interface	Photo	Difference
PCI-E with A+E key		Interface (RF is the same.)
PCI-E with E key		

4. Simultaneously transmission condition (only for SKU A, B).

Condition	Technology	
1	WLAN (2.4GHz)	Bluetooth
2	WLAN (5GHz)	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

5. The EUT has dual antenna and tri antenna, please refer to the following table:

Dual antenna
CON1+CON2 ➢ 2X2 WIFI Antenna port: CON1 & CON2 ➢ 1X1 BT Antenna port: CON1 ➢ WiFi/BT used Time-division duplex function at CON1, so WiFi/BT not transmitter simultaneous at CON1.
Tri antenna
CON1+CON2+CON3 ➢ 2X2 WIFI Antenna port: CON1 & CON2 ➢ 1X1 BT Antenna port: CON3 or CON1 ➢ If BT function at CON1, WiFi/BT used Time-division duplex function, so WiFi/BT not transmitter simultaneous at CON1. ➢ If BT function at CON3, WiFi/BT can transmitter simultaneous for BT at CON 3 and WiFi at CON1 & CON2.

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

Antenna No.	CON No.	Brand	Model	Ant. Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connecter Type
1	CON1 CON2 CON3 (only for SKU A,B)	LYNwave	ALA110-222050-300011	3.5	2.4~2.4835	PIFA	i-pex(MHF)
				5	5.15~5.85	PIFA	i-pex(MHF)
2	CON1 CON2 CON3 (only for SKU A,B)	PSA	RFDPA171320EMLB301	3.14	2.4~2.4835	Dipole	i-pex(MHF)
				5	5.15~5.85	Dipole	i-pex(MHF)

7. 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 for BT-EDR mode:

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≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	With PIFA Antenna
2	√	√	-	-	With Dipole Antenna

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

Note: 1. The EUT's antenna (PIFA) 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.

CON 3 / CON 1 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	3DH5

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.

CON 3 Mode				
AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0	FHSS	GFSK	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.

CON 3 Mode				
AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0	FHSS	GFSK	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.

CON 1 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	3DH5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	22deg. C, 66%RH	120Vac, 60Hz	Robert Cheng
RE<1G	21deg. C, 64%RH	120Vac, 60Hz	Steven Chiang
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.3 Description of Support Units

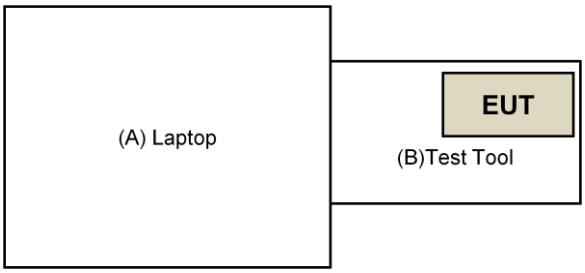
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	Test Tool	NA	NA	NA	NA	Supplied by client

Note:

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

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 15.247 Meas Guidance v05
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001	Jan. 15, 2018	Jan. 14, 2019
RF Cable	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-2	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-3	Mar. 21, 2018	Mar. 20, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier Mini-Circuits	ZVA-183-S+	AMP-ZVA-03	May 10, 2018	May 09, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150318	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
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 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Oct. 01 to 22, 2018

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

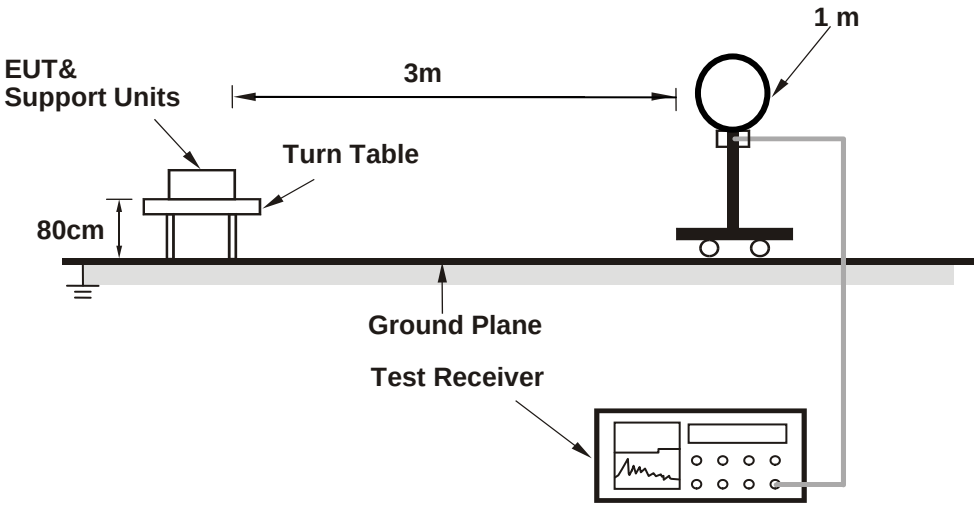
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz 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

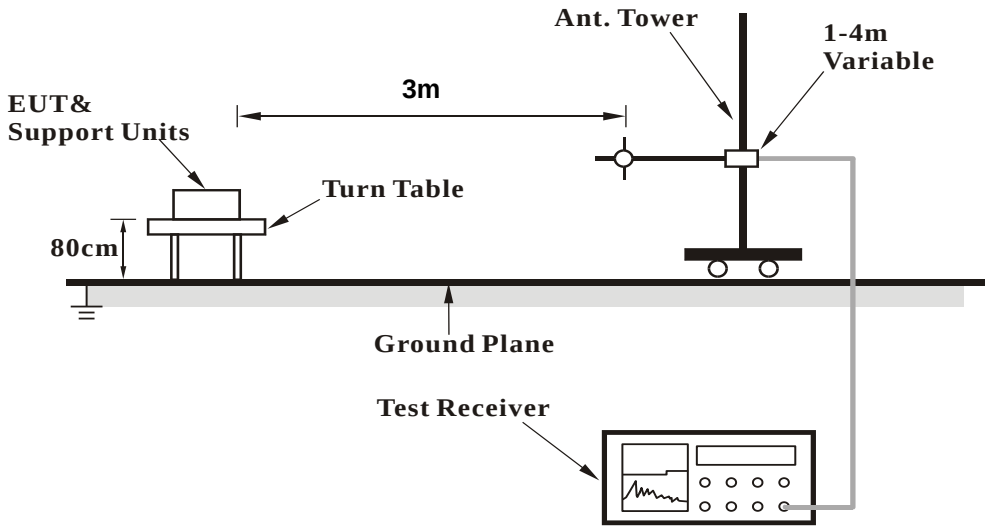
No deviation.

4.1.5 Test Setup

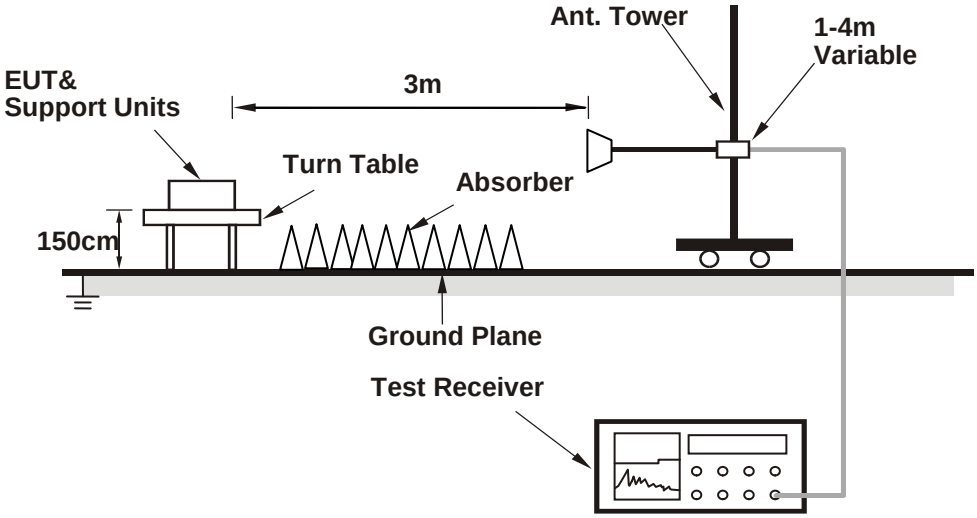
For Radiated emission below 30MHz



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 (Bluetooth RF test tool (5.2.1.21)) has been activated to set the EUT on specific status.

4.1.7 Test Results (Mode 1)

CON 3 Mode

Above 1GHz Data:

BT_GFSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	51.3 PK	74.0	-22.7	2.86 H	83	53.5	-2.2
2	2390.00	37.9 AV	54.0	-16.1	2.86 H	83	40.1	-2.2
3	*2402.00	112.0 PK			2.86 H	83	114.3	-2.3
4	*2402.00	81.9 AV			2.86 H	83	84.2	-2.3
5	4804.00	41.9 PK	74.0	-32.1	1.73 H	339	40.1	1.8
6	4804.00	11.8 AV	54.0	-42.2	1.73 H	339	10.0	1.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	51.2 PK	74.0	-22.8	1.28 V	135	53.4	-2.2
2	2390.00	39.2 AV	54.0	-14.8	1.28 V	135	41.4	-2.2
3	*2402.00	102.1 PK			1.28 V	135	104.4	-2.3
4	*2402.00	72.0 AV			1.28 V	135	74.3	-2.3
5	4804.00	43.8 PK	74.0	-30.2	1.63 V	326	42.0	1.8
6	4804.00	13.7 AV	54.0	-40.3	1.63 V	326	11.9	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	112.1 PK			2.95 H	79	114.7	-2.6
2	*2441.00	82.0 AV			2.95 H	79	84.6	-2.6
3	4882.00	42.8 PK	74.0	-31.2	1.66 H	344	40.8	2.0
4	4882.00	12.7 AV	54.0	-41.3	1.66 H	344	10.7	2.0
5	7323.00	48.7 PK	74.0	-25.3	2.01 H	196	40.3	8.4
6	7323.00	18.6 AV	54.0	-35.4	2.01 H	196	10.2	8.4
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	*2441.00	102.1 PK			1.32 V	125	104.7	-2.6
2	*2441.00	72.0 AV			1.32 V	125	74.6	-2.6
3	4882.00	43.5 PK	74.0	-30.5	1.58 V	334	41.5	2.0
4	4882.00	13.4 AV	54.0	-40.6	1.58 V	334	11.4	2.0
5	7323.00	48.6 PK	74.0	-25.4	2.06 V	162	40.2	8.4
6	7323.00	18.5 AV	54.0	-35.5	2.06 V	162	10.1	8.4

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. 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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	112.3 PK			3.04 H	99	114.9	-2.6
2	*2480.00	82.2 AV			3.04 H	99	84.8	-2.6
3	2483.50	53.0 PK	74.0	-21.0	3.04 H	99	55.4	-2.4
4	2483.50	22.9 AV	54.0	-31.1	3.04 H	99	25.3	-2.4
5	4960.00	42.6 PK	74.0	-31.4	1.72 H	354	40.5	2.1
6	4960.00	12.5 AV	54.0	-41.5	1.72 H	354	10.4	2.1
7	7440.00	49.1 PK	74.0	-24.9	2.07 H	192	40.3	8.8
8	7440.00	19.0 AV	54.0	-35.0	2.07 H	192	10.2	8.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	101.8 PK			1.29 V	147	104.4	-2.6
2	*2480.00	71.7 AV			1.29 V	147	74.3	-2.6
3	2483.50	50.0 PK	74.0	-24.0	1.29 V	147	52.4	-2.4
4	2483.50	19.9 AV	54.0	-34.1	1.29 V	147	22.3	-2.4
5	4960.00	43.1 PK	74.0	-30.9	1.57 V	318	41.0	2.1
6	4960.00	13.0 AV	54.0	-41.0	1.57 V	318	10.9	2.1
7	7440.00	49.0 PK	74.0	-25.0	2.11 V	184	40.2	8.8
8	7440.00	18.9 AV	54.0	-35.1	2.11 V	184	10.1	8.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

BT_8DPSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	51.9 PK	74.0	-22.1	3.03 H	99	54.1	-2.2
2	2390.00	38.4 AV	54.0	-15.6	3.03 H	99	40.6	-2.2
3	*2402.00	111.8 PK			3.03 H	99	114.1	-2.3
4	*2402.00	81.7 AV			3.03 H	99	84.0	-2.3
5	4804.00	43.0 PK	74.0	-31.0	1.64 H	334	41.2	1.8
6	4804.00	12.9 AV	54.0	-41.1	1.64 H	334	11.1	1.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	51.4 PK	74.0	-22.6	1.34 V	129	53.6	-2.2
2	2390.00	39.4 AV	54.0	-14.6	1.34 V	129	41.6	-2.2
3	*2402.00	101.4 PK			1.34 V	129	103.7	-2.3
4	*2402.00	71.3 AV			1.34 V	129	73.6	-2.3
5	4804.00	44.0 PK	74.0	-30.0	1.64 V	317	42.2	1.8
6	4804.00	13.9 AV	54.0	-40.1	1.64 V	317	12.1	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	112.6 PK			2.94 H	74	115.2	-2.6
2	*2441.00	82.5 AV			2.94 H	74	85.1	-2.6
3	4882.00	42.9 PK	74.0	-31.1	1.57 H	338	40.9	2.0
4	4882.00	12.8 AV	54.0	-41.2	1.57 H	338	10.8	2.0
5	7323.00	49.1 PK	74.0	-24.9	2.04 H	158	40.7	8.4
6	7323.00	19.0 AV	54.0	-35.0	2.04 H	158	10.6	8.4
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	*2441.00	102.0 PK			1.32 V	119	104.6	-2.6
2	*2441.00	71.9 AV			1.32 V	119	74.5	-2.6
3	4882.00	43.4 PK	74.0	-30.6	1.57 V	344	41.4	2.0
4	4882.00	13.3 AV	54.0	-40.7	1.57 V	344	11.3	2.0
5	7323.00	48.7 PK	74.0	-25.3	2.01 V	181	40.3	8.4
6	7323.00	18.6 AV	54.0	-35.4	2.01 V	181	10.2	8.4

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. 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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	112.5 PK			3.02 H	84	115.1	-2.6
2	*2480.00	82.4 AV			3.02 H	84	85.0	-2.6
3	2483.50	53.7 PK	74.0	-20.3	3.02 H	84	56.1	-2.4
4	2483.50	23.6 AV	54.0	-30.4	3.02 H	84	26.0	-2.4
5	4960.00	42.4 PK	74.0	-31.6	1.67 H	343	40.3	2.1
6	4960.00	12.3 AV	54.0	-41.7	1.67 H	343	10.2	2.1
7	7440.00	48.4 PK	74.0	-25.6	2.04 H	184	39.6	8.8
8	7440.00	18.3 AV	54.0	-35.7	2.04 H	184	9.5	8.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	102.1 PK			1.27 V	138	104.7	-2.6
2	*2480.00	72.0 AV			1.27 V	138	74.6	-2.6
3	2483.50	50.5 PK	74.0	-23.5	1.27 V	138	52.9	-2.4
4	2483.50	20.4 AV	54.0	-33.6	1.27 V	138	22.8	-2.4
5	4960.00	43.8 PK	74.0	-30.2	1.68 V	317	41.7	2.1
6	4960.00	13.7 AV	54.0	-40.3	1.68 V	317	11.6	2.1
7	7440.00	48.9 PK	74.0	-25.1	2.03 V	160	40.1	8.8
8	7440.00	18.8 AV	54.0	-35.2	2.03 V	160	10.0	8.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

Below 1GHz Worst-Case Data

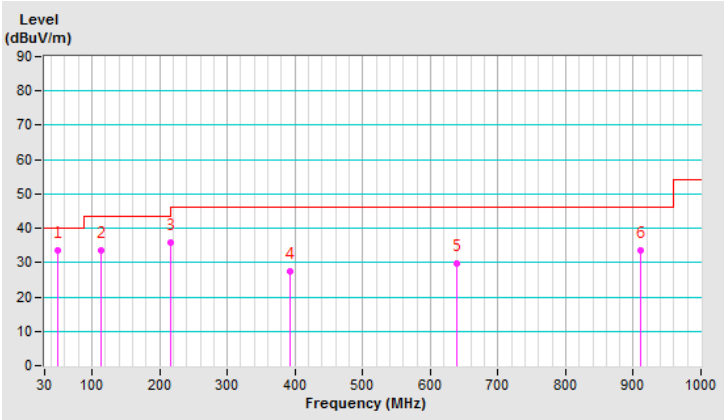
BT_GFSK

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	49.85	33.5 QP	40.0	-6.5	1.00 H	95	41.4	-7.9
2	112.89	33.7 QP	43.5	-9.8	1.50 H	110	44.1	-10.4
3	216.60	35.7 QP	46.0	-10.3	1.00 H	68	46.9	-11.2
4	392.49	27.6 QP	46.0	-18.4	1.00 H	254	32.0	-4.4
5	640.01	29.6 QP	46.0	-16.4	1.50 H	137	28.2	1.4
6	911.39	33.6 QP	46.0	-12.4	1.50 H	30	27.9	5.7

REMARKS:

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

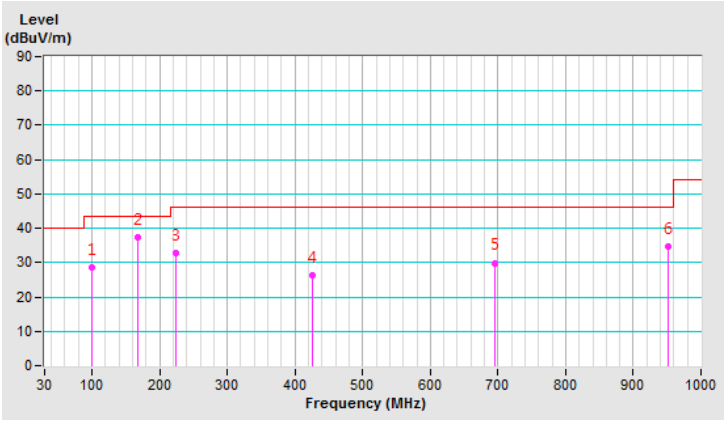


CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	99.79	28.5 QP	43.5	-15.0	1.00 V	88	40.8	-12.3
2	**167.44**	**37.3 QP**	**43.5**	**-6.2**	**1.00 V**	**324**	**45.4**	**-8.1**
3	223.25	32.7 QP	46.0	-13.3	1.50 V	177	44.0	-11.3
4	426.68	26.4 QP	46.0	-19.6	1.50 V	192	29.8	-3.4
5	696.20	29.9 QP	46.0	-16.1	2.00 V	311	28.0	1.9
6	952.28	34.6 QP	46.0	-11.4	2.00 V	245	28.6	6.0

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 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.



CON 1 Mode

Above 1GHz Data:

BT_GFSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	51.6 PK	74.0	-22.4	2.64 H	71	53.8	-2.2
2	2390.00	38.2 AV	54.0	-15.8	2.64 H	71	40.4	-2.2
3	*2402.00	113.2 PK			2.64 H	71	115.5	-2.3
4	*2402.00	83.1 AV			2.64 H	71	85.4	-2.3
5	4804.00	41.9 PK	74.0	-32.1	1.66 H	323	40.1	1.8
6	4804.00	11.8 AV	54.0	-42.2	1.66 H	323	10.0	1.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	50.0 PK	74.0	-24.0	1.32 V	133	52.2	-2.2
2	2390.00	38.6 AV	54.0	-15.4	1.32 V	133	40.8	-2.2
3	*2402.00	101.9 PK			1.32 V	133	104.2	-2.3
4	*2402.00	71.8 AV			1.32 V	133	74.1	-2.3
5	4804.00	42.3 PK	74.0	-31.7	1.58 V	313	40.5	1.8
6	4804.00	12.2 AV	54.0	-41.8	1.58 V	313	10.4	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	112.7 PK			2.57 H	72	115.3	-2.6
2	*2441.00	82.6 AV			2.57 H	72	85.2	-2.6
3	4882.00	42.0 PK	74.0	-32.0	1.65 H	294	40.0	2.0
4	4882.00	11.9 AV	54.0	-42.1	1.65 H	294	9.9	2.0
5	7323.00	48.7 PK	74.0	-25.3	2.14 H	191	40.3	8.4
6	7323.00	18.6 AV	54.0	-35.4	2.14 H	191	10.2	8.4
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	*2441.00	101.6 PK			1.36 V	151	104.2	-2.6
2	*2441.00	71.5 AV			1.36 V	151	74.1	-2.6
3	4882.00	42.0 PK	74.0	-32.0	1.64 V	304	40.0	2.0
4	4882.00	11.9 AV	54.0	-42.1	1.64 V	304	9.9	2.0
5	7323.00	48.3 PK	74.0	-25.7	2.10 V	167	39.9	8.4
6	7323.00	18.2 AV	54.0	-35.8	2.10 V	167	9.8	8.4

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. 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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	112.7 PK			2.75 H	66	115.3	-2.6
2	*2480.00	82.6 AV			2.75 H	66	85.2	-2.6
3	2483.50	54.7 PK	74.0	-19.3	2.75 H	66	57.1	-2.4
4	2483.50	24.6 AV	54.0	-29.4	2.75 H	66	27.0	-2.4
5	4960.00	42.6 PK	74.0	-31.4	1.69 H	294	40.5	2.1
6	4960.00	12.5 AV	54.0	-41.5	1.69 H	294	10.4	2.1
7	7440.00	48.7 PK	74.0	-25.3	2.13 H	181	39.9	8.8
8	7440.00	18.6 AV	54.0	-35.4	2.13 H	181	9.8	8.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	101.3 PK			1.36 V	151	103.9	-2.6
2	*2480.00	71.2 AV			1.36 V	151	73.8	-2.6
3	2483.50	50.8 PK	74.0	-23.2	1.36 V	151	53.2	-2.4
4	2483.50	20.7 AV	54.0	-33.3	1.36 V	151	23.1	-2.4
5	4960.00	42.1 PK	74.0	-31.9	1.64 V	304	40.0	2.1
6	4960.00	12.0 AV	54.0	-42.0	1.64 V	304	9.9	2.1
7	7440.00	48.5 PK	74.0	-25.5	2.10 V	167	39.7	8.8
8	7440.00	18.4 AV	54.0	-35.6	2.10 V	167	9.6	8.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

BT_8DPSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	51.8 PK	74.0	-22.2	2.86 H	65	54.0	-2.2
2	2390.00	38.4 AV	54.0	-15.6	2.86 H	65	40.6	-2.2
3	*2402.00	112.2 PK			2.86 H	65	114.5	-2.3
4	*2402.00	82.1 AV			2.86 H	65	84.4	-2.3
5	4804.00	41.7 PK	74.0	-32.3	1.61 H	297	39.9	1.8
6	4804.00	11.6 AV	54.0	-42.4	1.61 H	297	9.8	1.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	50.8 PK	74.0	-23.2	1.36 V	151	53.0	-2.2
2	2390.00	38.9 AV	54.0	-15.1	1.36 V	151	41.1	-2.2
3	*2402.00	102.0 PK			1.36 V	151	104.3	-2.3
4	*2402.00	71.9 AV			1.36 V	151	74.2	-2.3
5	4804.00	42.9 PK	74.0	-31.1	1.64 V	304	41.1	1.8
6	4804.00	12.8 AV	54.0	-41.2	1.64 V	304	11.0	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	111.5 PK			2.84 H	51	114.1	-2.6
2	*2441.00	81.4 AV			2.84 H	51	84.0	-2.6
3	4882.00	42.2 PK	74.0	-31.8	1.71 H	308	40.2	2.0
4	4882.00	12.1 AV	54.0	-41.9	1.71 H	308	10.1	2.0
5	7323.00	48.5 PK	74.0	-25.5	2.22 H	173	40.1	8.4
6	7323.00	18.4 AV	54.0	-35.6	2.22 H	173	10.0	8.4
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	*2441.00	101.3 PK			1.36 V	151	103.9	-2.6
2	*2441.00	71.2 AV			1.36 V	151	73.8	-2.6
3	4882.00	42.2 PK	74.0	-31.8	1.64 V	304	40.2	2.0
4	4882.00	12.1 AV	54.0	-41.9	1.64 V	304	10.1	2.0
5	7323.00	48.1 PK	74.0	-25.9	2.10 V	167	39.7	8.4
6	7323.00	18.0 AV	54.0	-36.0	2.10 V	167	9.6	8.4

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. 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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 78	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	*2480.00	111.7 PK			2.75 H	70	114.3	-2.6
2	*2480.00	81.6 AV			2.75 H	70	84.2	-2.6
3	2483.50	54.5 PK	74.0	-19.5	2.75 H	70	56.9	-2.4
4	2483.50	24.4 AV	54.0	-29.6	2.75 H	70	26.8	-2.4
5	4960.00	42.1 PK	74.0	-31.9	1.71 H	296	40.0	2.1
6	4960.00	12.0 AV	54.0	-42.0	1.71 H	296	9.9	2.1
7	7440.00	48.6 PK	74.0	-25.4	2.12 H	180	39.8	8.8
8	7440.00	18.5 AV	54.0	-35.5	2.12 H	180	9.7	8.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	101.9 PK			1.36 V	151	104.5	-2.6
2	*2480.00	71.8 AV			1.36 V	151	74.4	-2.6
3	2483.50	50.1 PK	74.0	-23.9	1.36 V	151	52.5	-2.4
4	2483.50	20.0 AV	54.0	-34.0	1.36 V	151	22.4	-2.4
5	4960.00	42.3 PK	74.0	-31.7	1.64 V	304	40.2	2.1
6	4960.00	12.2 AV	54.0	-41.8	1.64 V	304	10.1	2.1
7	7440.00	48.1 PK	74.0	-25.9	2.10 V	167	39.3	8.8
8	7440.00	18.0 AV	54.0	-36.0	2.10 V	167	9.2	8.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

4.1.8 Test Results (Mode 2)

CON 3 Mode

Above 1GHz Data:

BT_GFSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	50.2 PK	74.0	-23.8	1.10 H	48	52.4	-2.2
2	2390.00	39.2 AV	54.0	-14.8	1.10 H	48	41.4	-2.2
3	*2402.00	100.5 PK			1.10 H	48	102.8	-2.3
4	*2402.00	70.4 AV			1.10 H	48	72.7	-2.3
5	4804.00	44.6 PK	74.0	-29.4	1.78 H	252	42.8	1.8
6	4804.00	14.5 AV	54.0	-39.5	1.78 H	252	12.7	1.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	51.3 PK	74.0	-22.7	1.29 V	193	53.5	-2.2
2	2390.00	39.7 AV	54.0	-14.3	1.29 V	193	41.9	-2.2
3	*2402.00	107.6 PK			1.29 V	193	109.9	-2.3
4	*2402.00	77.5 AV			1.29 V	193	79.8	-2.3
5	4804.00	43.7 PK	74.0	-30.3	2.43 V	313	41.9	1.8
6	4804.00	13.6 AV	54.0	-40.4	2.43 V	313	11.8	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	101.3 PK			1.08 H	52	103.9	-2.6
2	*2441.00	71.2 AV			1.08 H	52	73.8	-2.6
3	4882.00	44.4 PK	74.0	-29.6	1.77 H	250	42.4	2.0
4	4882.00	14.3 AV	54.0	-39.7	1.77 H	250	12.3	2.0
5	7323.00	48.0 PK	74.0	-26.0	2.41 H	222	39.6	8.4
6	7323.00	17.9 AV	54.0	-36.1	2.41 H	222	9.5	8.4
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	*2441.00	108.2 PK			1.00 V	195	110.8	-2.6
2	*2441.00	78.1 AV			1.00 V	195	80.7	-2.6
3	4882.00	43.9 PK	74.0	-30.1	2.41 V	333	41.9	2.0
4	4882.00	13.8 AV	54.0	-40.2	2.41 V	333	11.8	2.0
5	7323.00	47.8 PK	74.0	-26.2	1.56 V	104	39.4	8.4
6	7323.00	17.7 AV	54.0	-36.3	1.56 V	104	9.3	8.4

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. 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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	102.1 PK			1.06 H	62	104.7	-2.6
2	*2480.00	72.0 AV			1.06 H	62	74.6	-2.6
3	2483.50	49.8 PK	74.0	-24.2	1.06 H	62	52.2	-2.4
4	2483.50	19.7 AV	54.0	-34.3	1.06 H	62	22.1	-2.4
5	4960.00	44.7 PK	74.0	-29.3	1.82 H	250	42.6	2.1
6	4960.00	14.6 AV	54.0	-39.4	1.82 H	250	12.5	2.1
7	7440.00	47.9 PK	74.0	-26.1	2.39 H	241	39.1	8.8
8	7440.00	17.8 AV	54.0	-36.2	2.39 H	241	9.0	8.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	109.0 PK			1.00 V	188	111.6	-2.6
2	*2480.00	78.9 AV			1.00 V	188	81.5	-2.6
3	2483.50	51.7 PK	74.0	-22.3	1.00 V	188	54.1	-2.4
4	2483.50	21.6 AV	54.0	-32.4	1.00 V	188	24.0	-2.4
5	4960.00	44.7 PK	74.0	-29.3	2.43 V	331	42.6	2.1
6	4960.00	14.6 AV	54.0	-39.4	2.43 V	331	12.5	2.1
7	7440.00	48.6 PK	74.0	-25.4	1.66 V	106	39.8	8.8
8	7440.00	18.5 AV	54.0	-35.5	1.66 V	106	9.7	8.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

BT_8DPSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	50.1 PK	74.0	-23.9	1.15 H	54	52.3	-2.2
2	2390.00	39.3 AV	54.0	-14.7	1.15 H	54	41.5	-2.2
3	*2402.00	98.9 PK			1.15 H	54	101.2	-2.3
4	*2402.00	68.8 AV			1.15 H	54	71.1	-2.3
5	4804.00	45.2 PK	74.0	-28.8	1.85 H	231	43.4	1.8
6	4804.00	15.1 AV	54.0	-38.9	1.85 H	231	13.3	1.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	51.3 PK	74.0	-22.7	1.01 V	199	53.5	-2.2
2	2390.00	39.6 AV	54.0	-14.4	1.01 V	199	41.8	-2.2
3	*2402.00	105.9 PK			1.01 V	199	108.2	-2.3
4	*2402.00	75.8 AV			1.01 V	199	78.1	-2.3
5	4804.00	43.9 PK	74.0	-30.1	2.43 V	324	42.1	1.8
6	4804.00	13.8 AV	54.0	-40.2	2.43 V	324	12.0	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	99.4 PK			1.08 H	50	102.0	-2.6
2	*2441.00	69.3 AV			1.08 H	50	71.9	-2.6
3	4882.00	44.7 PK	74.0	-29.3	1.82 H	245	42.7	2.0
4	4882.00	14.6 AV	54.0	-39.4	1.82 H	245	12.6	2.0
5	7323.00	48.4 PK	74.0	-25.6	2.42 H	235	40.0	8.4
6	7323.00	18.3 AV	54.0	-35.7	2.42 H	235	9.9	8.4
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	*2441.00	106.5 PK			1.04 V	179	109.1	-2.6
2	*2441.00	76.4 AV			1.04 V	179	79.0	-2.6
3	4882.00	44.2 PK	74.0	-29.8	2.46 V	325	42.2	2.0
4	4882.00	14.1 AV	54.0	-39.9	2.46 V	325	12.1	2.0
5	7323.00	49.1 PK	74.0	-24.9	1.63 V	97	40.7	8.4
6	7323.00	19.0 AV	54.0	-35.0	1.63 V	97	10.6	8.4

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. 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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	100.1 PK			1.05 H	36	102.7	-2.6
2	*2480.00	70.0 AV			1.05 H	36	72.6	-2.6
3	2483.50	50.6 PK	74.0	-23.4	1.05 H	36	53.0	-2.4
4	2483.50	20.5 AV	54.0	-33.5	1.05 H	36	22.9	-2.4
5	4960.00	45.0 PK	74.0	-29.0	1.87 H	235	42.9	2.1
6	4960.00	14.9 AV	54.0	-39.1	1.87 H	235	12.8	2.1
7	7440.00	47.7 PK	74.0	-26.3	2.31 H	250	38.9	8.8
8	7440.00	17.6 AV	54.0	-36.4	2.31 H	250	8.8	8.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	107.3 PK			1.00 V	194	109.9	-2.6
2	*2480.00	77.2 AV			1.00 V	194	79.8	-2.6
3	2483.50	51.2 PK	74.0	-22.8	1.00 V	194	53.6	-2.4
4	2483.50	21.1 AV	54.0	-32.9	1.00 V	194	23.5	-2.4
5	4960.00	44.4 PK	74.0	-29.6	2.42 V	329	42.3	2.1
6	4960.00	14.3 AV	54.0	-39.7	2.42 V	329	12.2	2.1
7	7440.00	48.4 PK	74.0	-25.6	1.66 V	87	39.6	8.8
8	7440.00	18.3 AV	54.0	-35.7	1.66 V	87	9.5	8.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

Below 1GHz Worst-Case Data

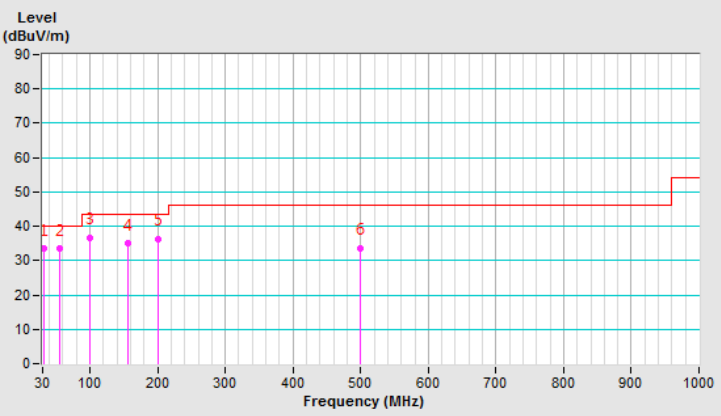
BT_GFSK

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	31.21	33.7 QP	40.0	-6.3	1.42 H	195	42.7	-9.0
2	54.85	33.5 QP	40.0	-6.5	1.89 H	135	41.5	-8.0
3	100.12	36.8 QP	43.5	-6.7	1.52 H	198	49.1	-12.3
4	156.85	35.0 QP	43.5	-8.5	1.59 H	211	42.5	-7.5
5	199.85	36.4 QP	43.5	-7.1	1.65 H	201	47.5	-11.1
6	499.98	33.8 QP	46.0	-12.2	1.35 H	165	35.6	-1.8

REMARKS:

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

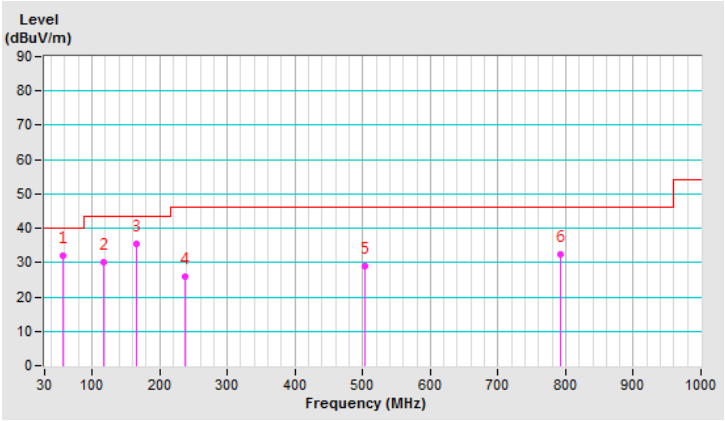


CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	57.85	31.9 QP	40.0	-8.1	1.62 V	181	40.0	-8.1
2	117.74	30.0 QP	43.5	-13.5	1.16 V	202	40.0	-10.0
3	166.75	35.5 QP	43.5	-8.0	1.65 V	201	43.6	-8.1
4	236.85	25.8 QP	46.0	-20.2	1.32 V	99	35.4	-9.6
5	502.74	29.1 QP	46.0	-16.9	1.87 V	143	30.8	-1.7
6	791.85	32.4 QP	46.0	-13.6	1.56 V	221	28.6	3.8

REMARKS:

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



CON 1 Mode

Above 1GHz Data:

BT_GFSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	50.5 PK	74.0	-23.5	1.15 H	58	52.7	-2.2
2	2390.00	39.2 AV	54.0	-14.8	1.15 H	58	41.4	-2.2
3	*2402.00	102.2 PK			1.15 H	58	104.5	-2.3
4	*2402.00	72.1 AV			1.15 H	58	74.4	-2.3
5	4804.00	44.8 PK	74.0	-29.2	1.76 H	229	43.0	1.8
6	4804.00	14.7 AV	54.0	-39.3	1.76 H	229	12.9	1.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	51.0 PK	74.0	-23.0	1.00 V	253	53.2	-2.2
2	2390.00	39.5 AV	54.0	-14.5	1.00 V	253	41.7	-2.2
3	*2402.00	108.9 PK			1.00 V	253	111.2	-2.3
4	*2402.00	78.8 AV			1.00 V	253	81.1	-2.3
5	4804.00	44.2 PK	74.0	-29.8	2.47 V	323	42.4	1.8
6	4804.00	14.1 AV	54.0	-39.9	2.47 V	323	12.3	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	102.6 PK			1.20 H	59	105.2	-2.6
2	*2441.00	72.5 AV			1.20 H	59	75.1	-2.6
3	4882.00	44.4 PK	74.0	-29.6	1.83 H	248	42.4	2.0
4	4882.00	14.3 AV	54.0	-39.7	1.83 H	248	12.3	2.0
5	7323.00	49.0 PK	74.0	-25.0	2.42 H	235	40.6	8.4
6	7323.00	18.9 AV	54.0	-35.1	2.42 H	235	10.5	8.4
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	*2441.00	109.3 PK			1.05 V	255	111.9	-2.6
2	*2441.00	79.2 AV			1.05 V	255	81.8	-2.6
3	4882.00	44.2 PK	74.0	-29.8	2.44 V	329	42.2	2.0
4	4882.00	14.1 AV	54.0	-39.9	2.44 V	329	12.1	2.0
5	7323.00	48.2 PK	74.0	-25.8	1.61 V	96	39.8	8.4
6	7323.00	18.1 AV	54.0	-35.9	1.61 V	96	9.7	8.4

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. 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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	104.3 PK			1.19 H	42	106.9	-2.6
2	*2480.00	74.2 AV			1.19 H	42	76.8	-2.6
3	2483.50	50.4 PK	74.0	-23.6	1.19 H	42	52.8	-2.4
4	2483.50	20.3 AV	54.0	-33.7	1.19 H	42	22.7	-2.4
5	4960.00	45.0 PK	74.0	-29.0	1.77 H	235	42.9	2.1
6	4960.00	14.9 AV	54.0	-39.1	1.77 H	235	12.8	2.1
7	7440.00	48.3 PK	74.0	-25.7	2.46 H	254	39.5	8.8
8	7440.00	18.2 AV	54.0	-35.8	2.46 H	254	9.4	8.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	110.9 PK			1.00 V	255	113.5	-2.6
2	*2480.00	80.8 AV			1.00 V	255	83.4	-2.6
3	2483.50	51.6 PK	74.0	-22.4	1.00 V	255	54.0	-2.4
4	2483.50	21.5 AV	54.0	-32.5	1.00 V	255	23.9	-2.4
5	4960.00	44.2 PK	74.0	-29.8	2.49 V	307	42.1	2.1
6	4960.00	14.1 AV	54.0	-39.9	2.49 V	307	12.0	2.1
7	7440.00	48.2 PK	74.0	-25.8	1.61 V	94	39.4	8.8
8	7440.00	18.1 AV	54.0	-35.9	1.61 V	94	9.3	8.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

BT_8DPSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	50.4 PK	74.0	-23.6	1.13 H	64	52.6	-2.2
2	2390.00	38.8 AV	54.0	-15.2	1.13 H	64	41.0	-2.2
3	*2402.00	100.4 PK			1.13 H	64	102.7	-2.3
4	*2402.00	70.3 AV			1.13 H	64	72.6	-2.3
5	4804.00	44.8 PK	74.0	-29.2	1.78 H	220	43.0	1.8
6	4804.00	14.7 AV	54.0	-39.3	1.78 H	220	12.9	1.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	51.2 PK	74.0	-22.8	1.04 V	252	53.4	-2.2
2	2390.00	39.9 AV	54.0	-14.1	1.04 V	252	42.1	-2.2
3	*2402.00	107.0 PK			1.04 V	252	109.3	-2.3
4	*2402.00	76.9 AV			1.04 V	252	79.2	-2.3
5	4804.00	44.2 PK	74.0	-29.8	2.44 V	303	42.4	1.8
6	4804.00	14.1 AV	54.0	-39.9	2.44 V	303	12.3	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	101.1 PK			1.14 H	54	103.7	-2.6
2	*2441.00	71.0 AV			1.14 H	54	73.6	-2.6
3	4882.00	44.7 PK	74.0	-29.3	1.81 H	220	42.7	2.0
4	4882.00	14.6 AV	54.0	-39.4	1.81 H	220	12.6	2.0
5	7323.00	48.1 PK	74.0	-25.9	2.43 H	231	39.7	8.4
6	7323.00	18.0 AV	54.0	-36.0	2.43 H	231	9.6	8.4
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	*2441.00	107.7 PK			1.12 V	254	110.3	-2.6
2	*2441.00	77.6 AV			1.12 V	254	80.2	-2.6
3	4882.00	44.2 PK	74.0	-29.8	2.46 V	303	42.2	2.0
4	4882.00	14.1 AV	54.0	-39.9	2.46 V	303	12.1	2.0
5	7323.00	48.2 PK	74.0	-25.8	1.57 V	117	39.8	8.4
6	7323.00	18.1 AV	54.0	-35.9	1.57 V	117	9.7	8.4

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. 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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	102.4 PK			1.09 H	44	105.0	-2.6
2	*2480.00	72.3 AV			1.09 H	44	74.9	-2.6
3	2483.50	50.9 PK	74.0	-23.1	1.09 H	44	53.3	-2.4
4	2483.50	20.8 AV	54.0	-33.2	1.09 H	44	23.2	-2.4
5	4960.00	44.3 PK	74.0	-29.7	1.80 H	237	42.2	2.1
6	4960.00	14.2 AV	54.0	-39.8	1.80 H	237	12.1	2.1
7	7440.00	48.3 PK	74.0	-25.7	2.45 H	238	39.5	8.8
8	7440.00	18.2 AV	54.0	-35.8	2.45 H	238	9.4	8.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	108.9 PK			1.00 V	257	111.5	-2.6
2	*2480.00	78.8 AV			1.00 V	257	81.4	-2.6
3	2483.50	52.0 PK	74.0	-22.0	1.00 V	257	54.4	-2.4
4	2483.50	21.9 AV	54.0	-32.1	1.00 V	257	24.3	-2.4
5	4960.00	44.2 PK	74.0	-29.8	2.43 V	317	42.1	2.1
6	4960.00	14.1 AV	54.0	-39.9	2.43 V	317	12.0	2.1
7	7440.00	48.2 PK	74.0	-25.8	1.67 V	99	39.4	8.8
8	7440.00	18.1 AV	54.0	-35.9	1.67 V	99	9.3	8.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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: 20log(3.125 / 100)= -30.1 dB
7. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle)

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	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2017	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 04, 2018	June 03, 2019
50 ohms Terminator	N/A	EMC-04	Nov. 01, 2017	Oct. 31, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
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: Oct. 13, 2018

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.

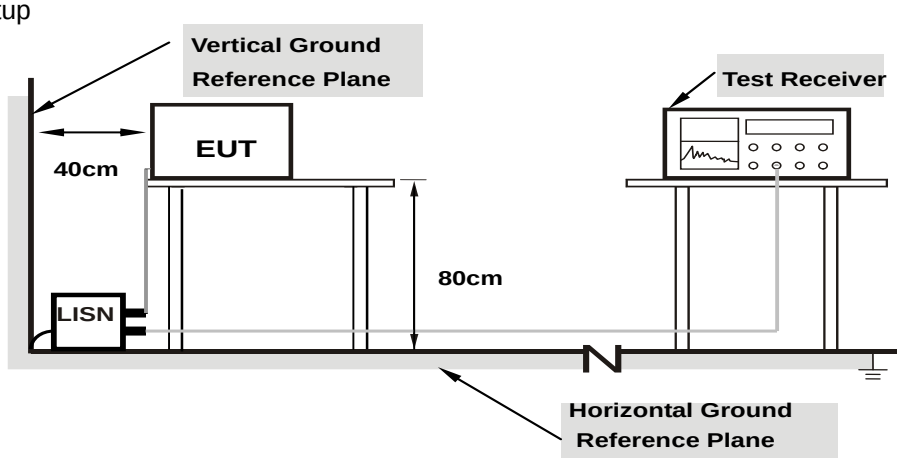
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

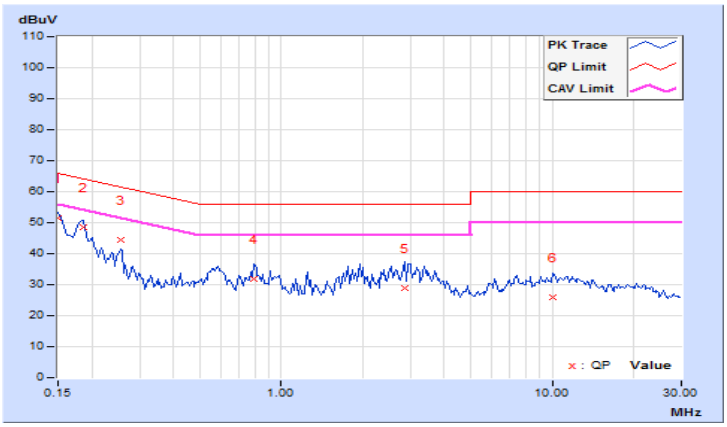
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	41.39	20.48	51.42	30.51	66.00	56.00	-14.58	-25.49
2	0.18516	10.05	38.35	22.75	48.40	32.80	64.25	54.25	-15.85	-21.45
3	0.25547	10.07	34.41	20.04	44.48	30.11	61.58	51.58	-17.10	-21.47
4	0.79453	10.14	21.77	9.51	31.91	19.65	56.00	46.00	-24.09	-26.35
5	2.86719	10.22	18.68	14.93	28.90	25.15	56.00	46.00	-27.10	-20.85
6	10.00781	10.54	15.38	11.84	25.92	22.38	60.00	50.00	-34.08	-27.62

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.

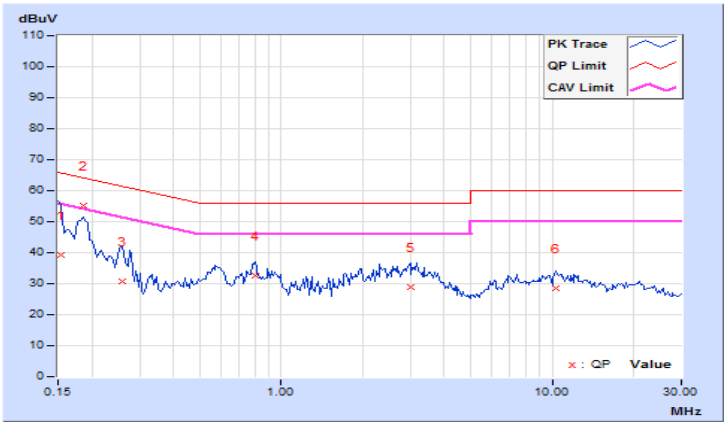


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.95	29.33	18.57	39.28	28.52	65.79	55.79	-26.51	-27.27
2	**0.18516**	**9.96**	**45.14**	**18.39**	**55.10**	**28.35**	**64.25**	**54.25**	**-9.15**	**-25.90**
3	0.25938	9.97	20.82	19.86	30.79	29.83	61.45	51.45	-30.66	-21.62
4	0.80234	10.02	22.51	11.99	32.53	22.01	56.00	46.00	-23.47	-23.99
5	2.99219	10.10	18.61	15.19	28.71	25.29	56.00	46.00	-27.29	-20.71
6	10.36719	10.41	17.97	10.82	28.38	21.23	60.00	50.00	-31.62	-28.77

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.

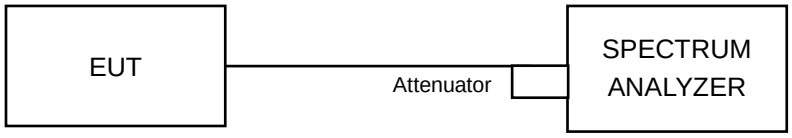


4.3 Number of Hopping Frequency Used

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

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

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

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

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

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

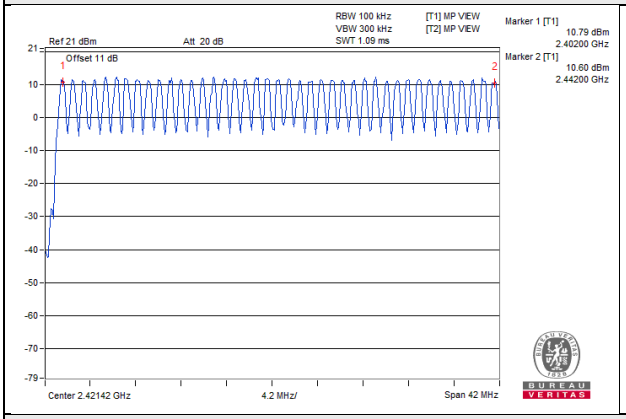
4.3.5 Deviation from Test Standard

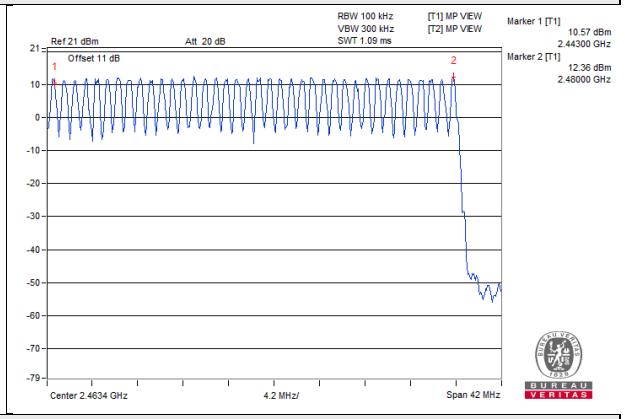
No deviation.

4.3.6 Test Results

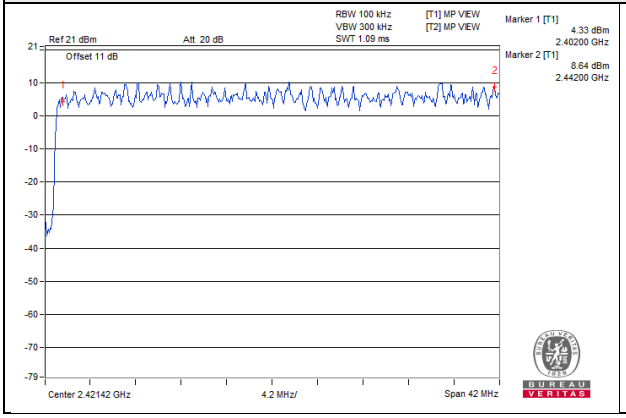
There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

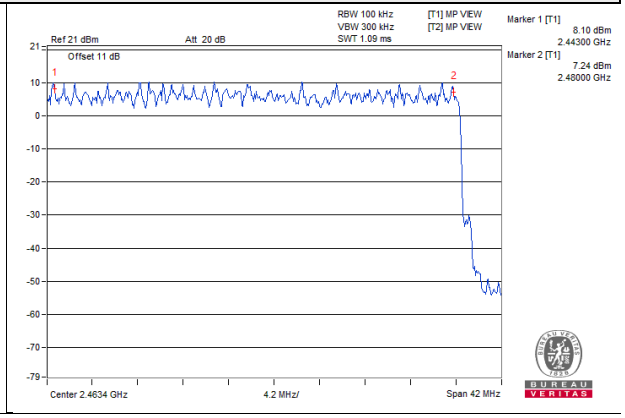
GFSK





8DPSK



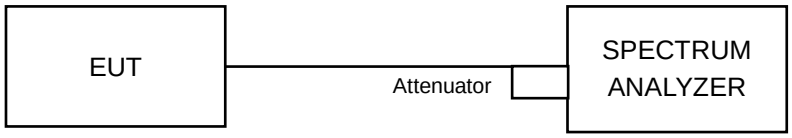


4.4 Dwell Time on Each Channel

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.

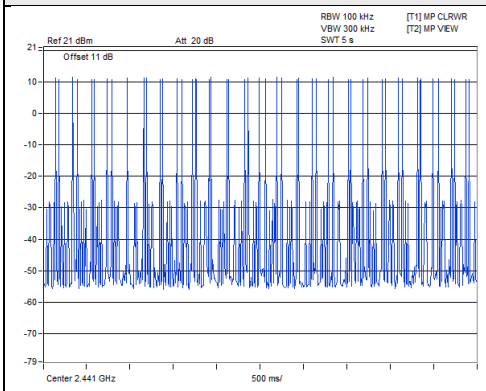
4.4.6 Test Results

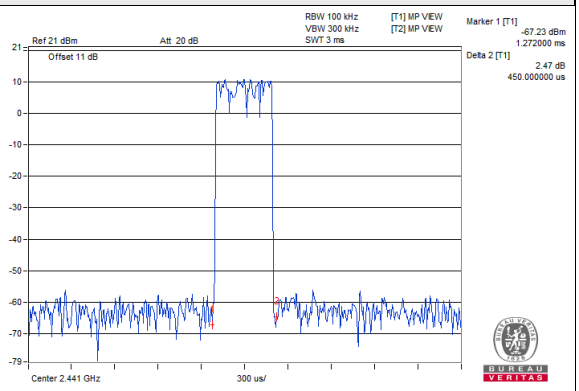
GFSK

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	49 (times / 5 sec) * 6.32 = 309.68 times	0.45	139.36	400
DH3	24 (times / 5 sec) * 6.32 = 151.68 times	1.7	257.86	400
DH5	17 (times / 5 sec) * 6.32 = 107.44 times	2.944	316.3	400

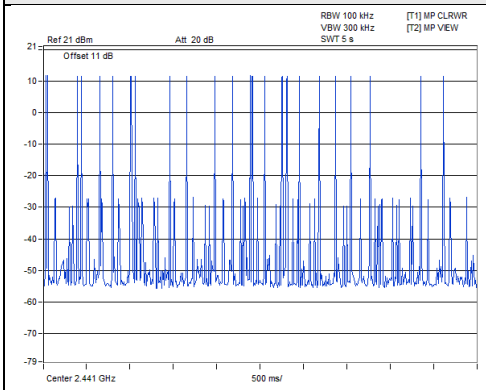
Note: Test plots of the transmitting time slot are shown on next page.

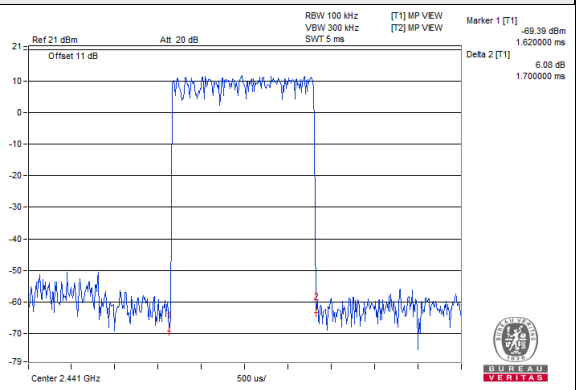
DH1


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
[T2] MP VIEW
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
500 ms/

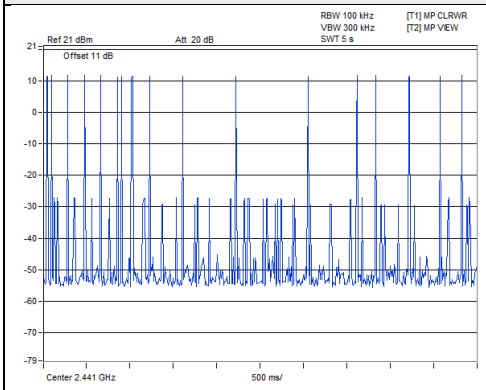

RBW 100 kHz
VBW 300 kHz
SWT 3 ms
[T1] MP VIEW
[T2] MP VIEW
Marker 1 [T1]
-67.23 dBm
1.272000 ms
Delta 2 [T1]
2.47 dB
450.000000 us
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
300 us/

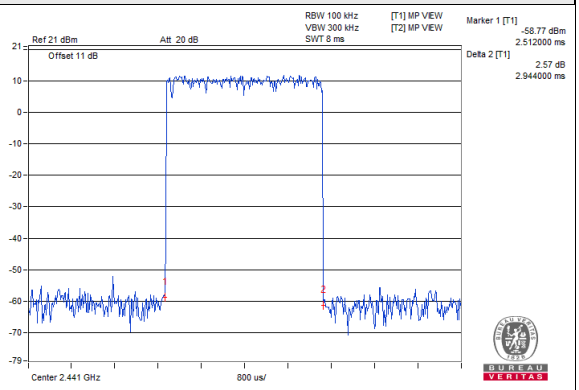
DH3


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
[T2] MP VIEW
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
[T2] MP VIEW
Marker 1 [T1]
-69.39 dBm
1.620000 ms
Delta 2 [T1]
6.08 dB
1.700000 ms
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
500 us/

DH5


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
[T2] MP VIEW
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
500 ms/

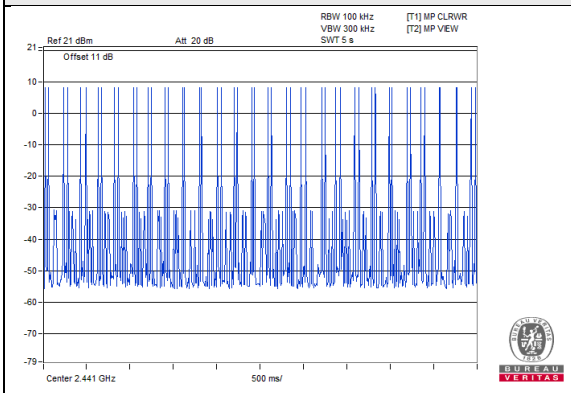

RBW 100 kHz
VBW 300 kHz
SWT 8 ms
[T1] MP VIEW
[T2] MP VIEW
Marker 1 [T1]
-58.77 dBm
2.512000 ms
Delta 2 [T1]
2.57 dB
2.944000 ms
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
800 us/

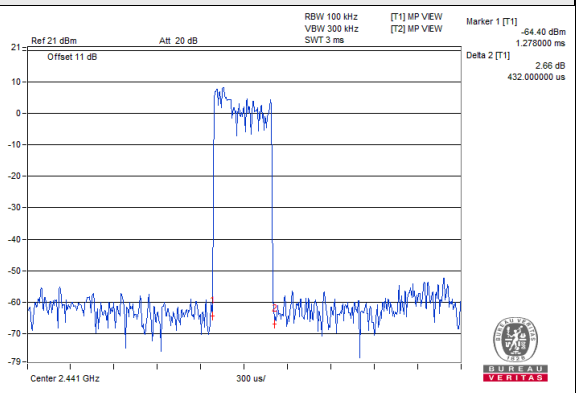
8DPSK

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
3DH1	50 (times / 5 sec) * 6.32 = 316 times	0.432	136.51	400
3DH3	26 (times / 5 sec) * 6.32 = 164.32 times	1.7	279.34	400
3DH5	18 (times / 5 sec) * 6.32 = 113.76 times	2.992	340.37	400

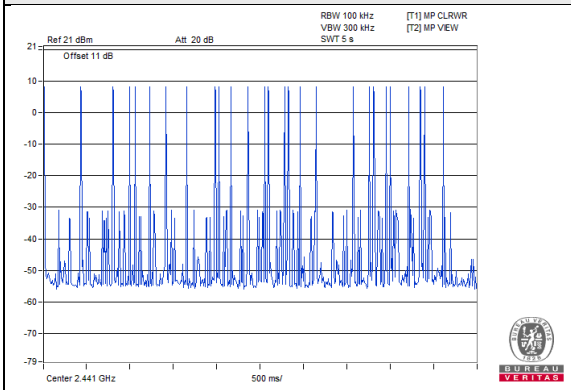
Note: Test plots of the transmitting time slot are shown on next page.

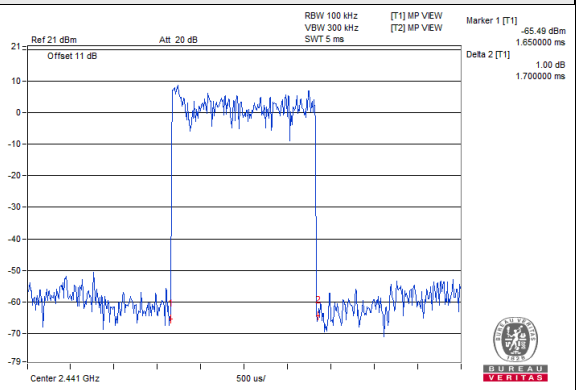
3DH1



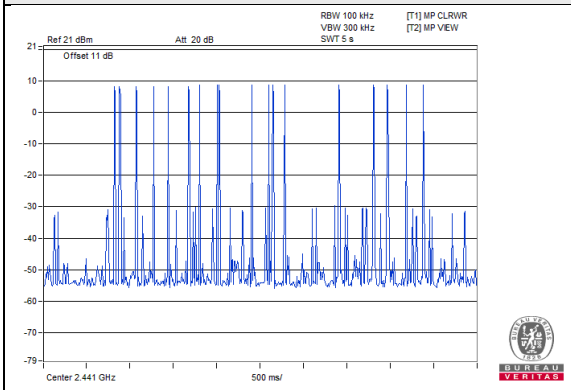


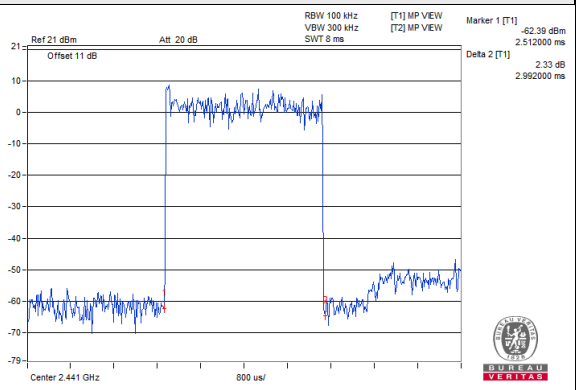
3DH3





3DH5



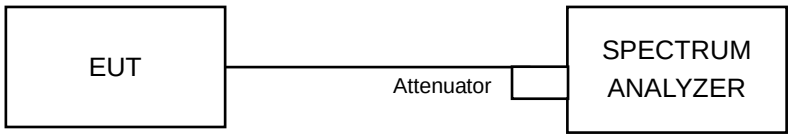


4.5 Channel Bandwidth

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 20dBbandwidth of hopping channel shell 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

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

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.

d. Detector = peak.

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

4.5.5 Deviation from Test Standard

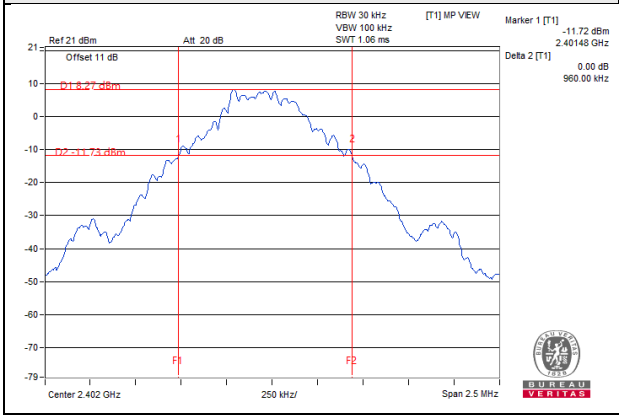
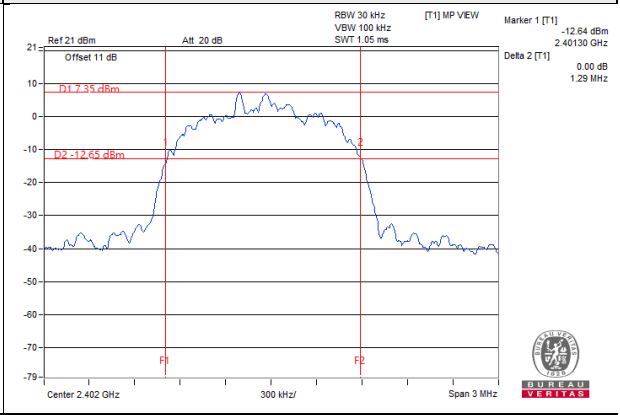
No deviation.

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	0.96	1.29
39	2441	0.96	1.29
78	2480	0.95	1.29

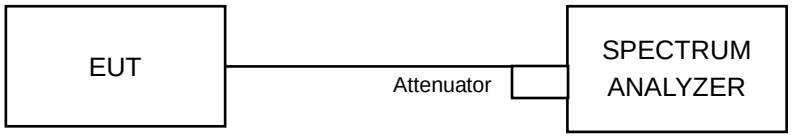
Spectrum Plot of Worst Value	
GFSK / CH 0	8DPSK / CH 0
	

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.

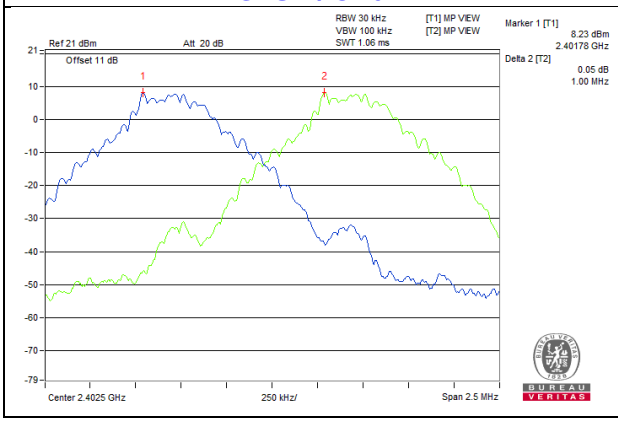
4.6.6 Test Results

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	0.96	1.29	0.64	0.86	Pass
39	2441	1.00	1.00	0.96	1.29	0.64	0.86	Pass
78	2480	1.00	1.00	0.95	1.29	0.64	0.86	Pass

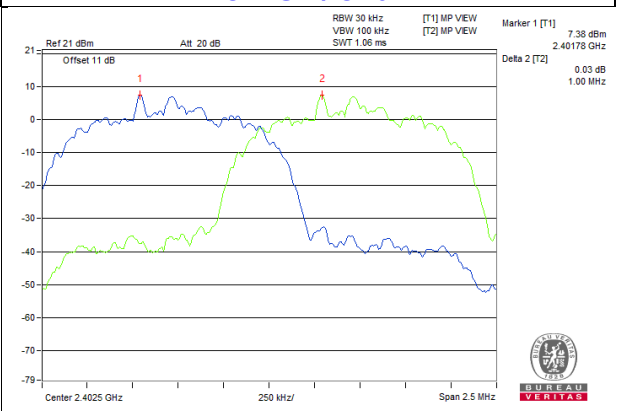
Note: The minimum limit is two-third 20dB bandwidth.

Spectrum Plot of Worst Value

GFSK / CH0



8DPSK / CH0

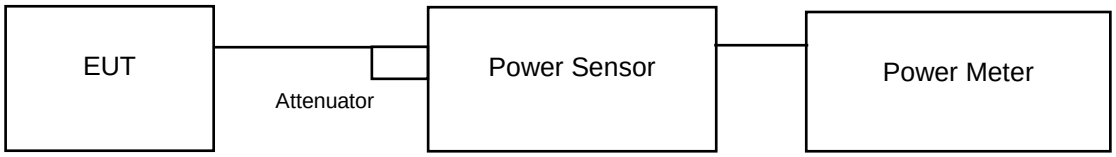


4.7 Maximum Output Power

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

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.

4.7.5 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

FOR PEAK POWER

Channel	Frequency (MHZ)	Output Power (mW)		Output Power (dBm)		Power Limit (mW)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	20.137	17.258	13.04	12.37	125	Pass
39	2441	19.275	16.982	12.85	12.30	125	Pass
78	2480	19.275	17.539	12.85	12.44	125	Pass

FOR AVERAGE POWER

Channel	Frequency (MHZ)	Avg. Power (mW)		Avg. Power (dBm)	
		GFSK	8DPSK	GFSK	8DPSK
0	2402	19.231	8.974	12.84	9.53
39	2441	18.408	8.831	12.65	9.46
78	2480	18.408	9.162	12.65	9.62

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

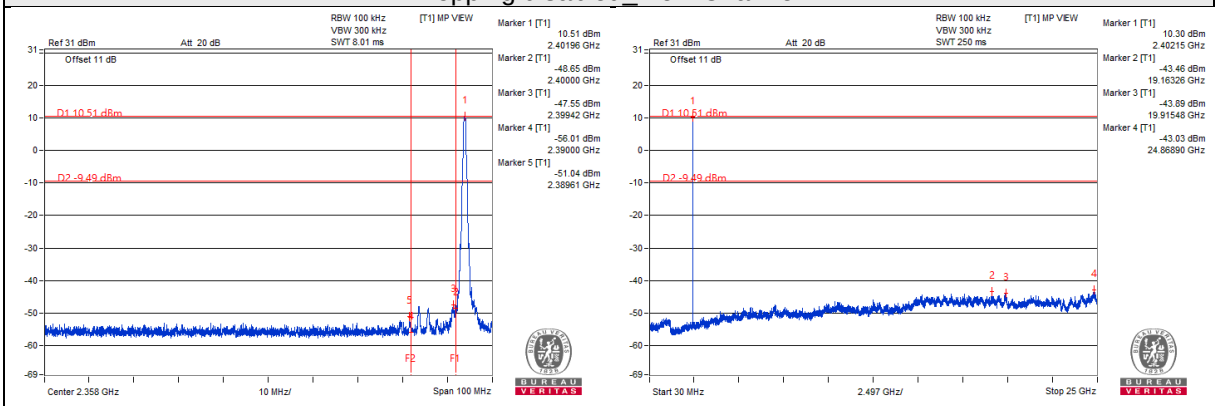
The software provided by client enabled the EUT to transmit and receive data at lowest and highest channel frequencies individually.

4.8.6 Test Results

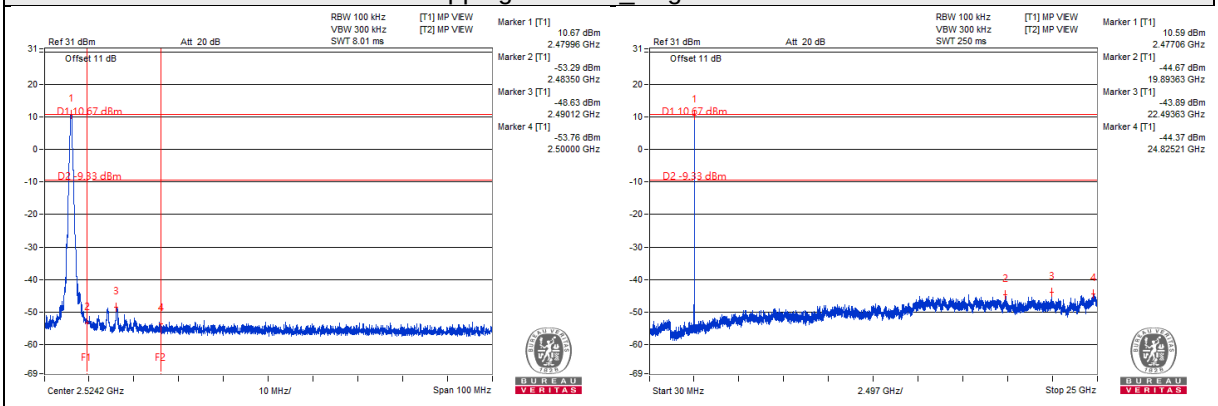
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

GFSK

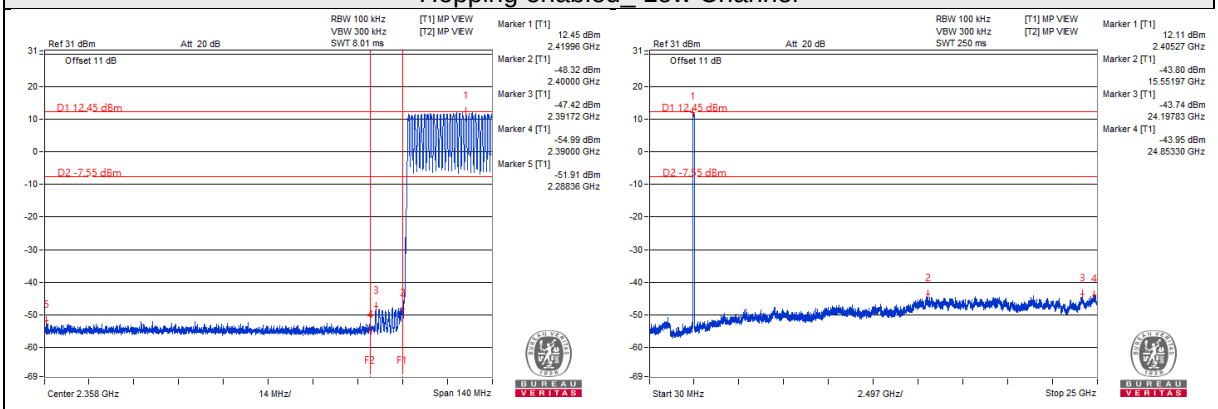
Hopping disabled_ Low Channel



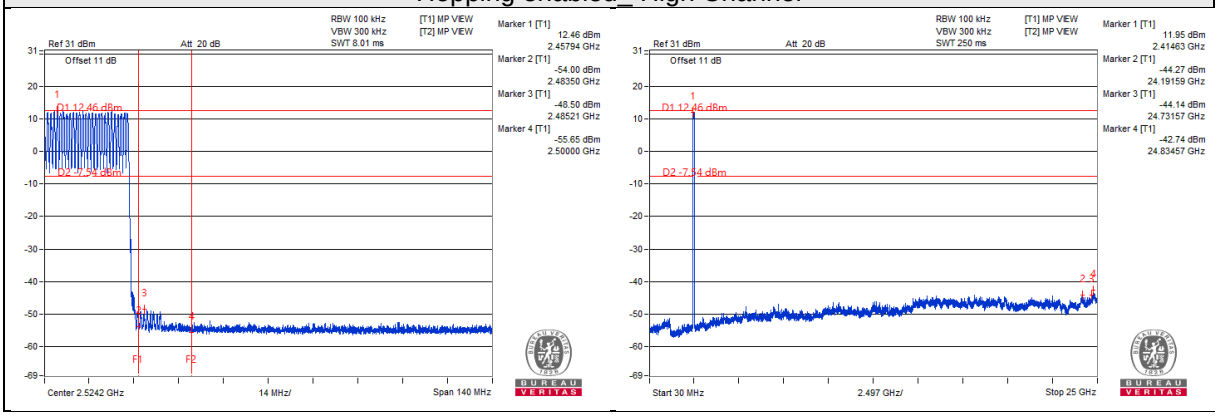
Hopping disabled_ High Channel



Hopping enabled_ Low Channel

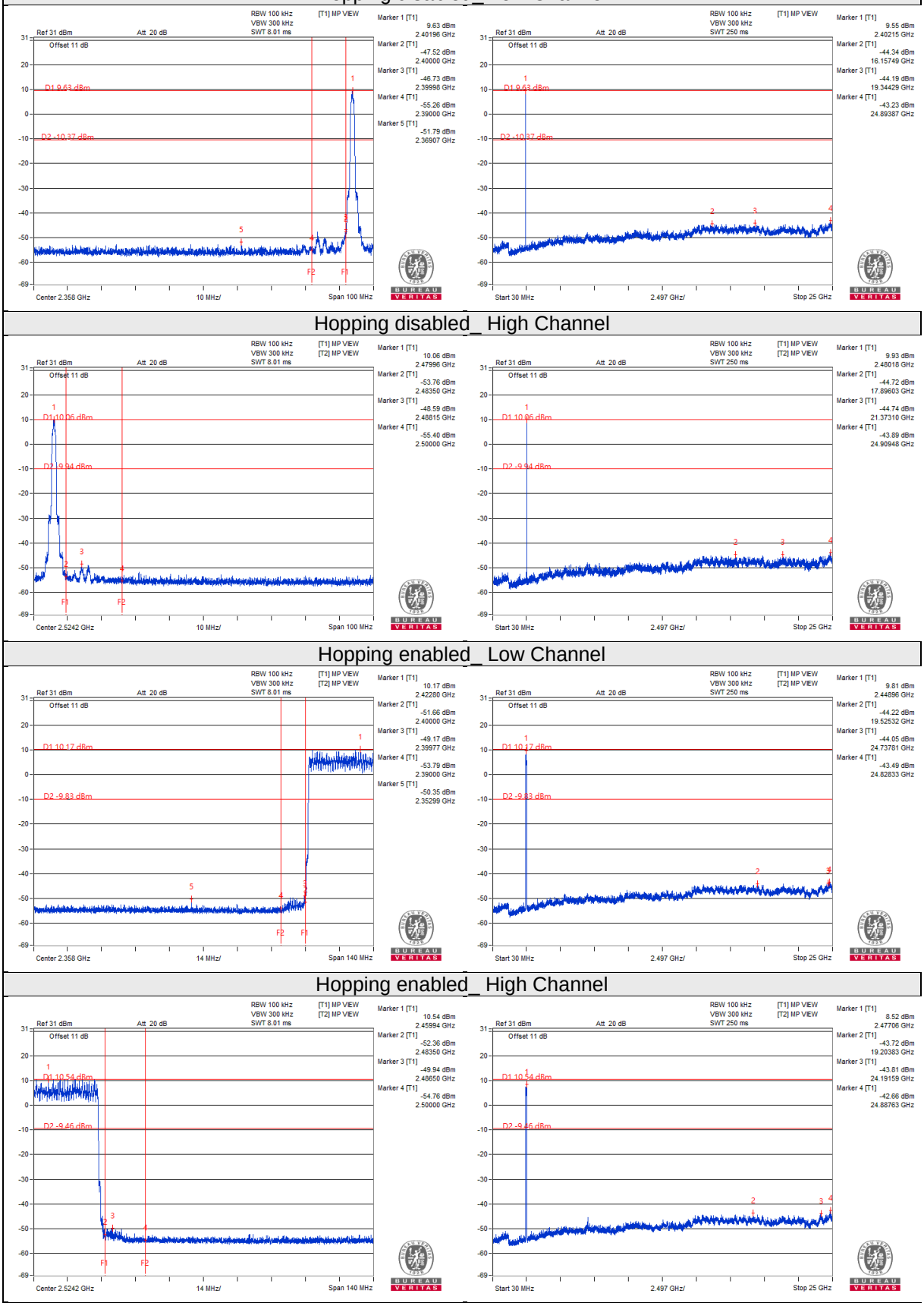


Hopping enabled_ High Channel



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 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:

Linko 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
Web Site: www.bureauveritas-adt.com

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

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