FCC Test Report (BT-EDR)

Report No.:	RF150730E02-2
FCC ID:	R68PW2050
Test Model:	PW 2050
Received Date:	July 30, 2015
Test Date:	Aug. 21 to Oct. 12, 2015
Issued Date:	Nov. 04, 2015
Applicant:	Lantronix Inc
Address:	7535 Irvine Center Drive Suite 100, Irvine CA 92618
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (1):	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
Test Location (3):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF150730E02-2	Original release.	Nov. 04, 2015

1 Certificate of Conformity

Product:	PremierWave 2050
Brand:	Lantronix
Test Model:	PW 2050
Sample Status:	ENGINEERING SAMPLE
Applicant:	Lantronix Inc
Test Date:	Aug. 21 to Oct. 12, 2015
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:** Nov. 04, 2015

Midoli Peng / Specialist

Approved by : _____ , **Date:** Nov. 04, 2015

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 -19.53dB at 0.37603MHz.
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 -3.4dB at 752.15MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is RSMA or 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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.37 dB
	200MHz ~1000MHz	3.72 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	4.00 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (BT-EDR)

Product	PremierWave 2050
Brand	Lantronix
Test Model	PW 2050
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	5Vdc 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	10.839mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. The EUT was included two variants, which are identical to each other in all aspects except for the following table:

Module Version	Product	Brand	Model	Different	Antenna
SKU #A	PremierWave 2050	Lantronix	PW 2050	SIP with one ethertronics chip ant and one UFL connector	ethertronics chip ant + ethertronics printed ant / ethertronics chip ant + Taoglas ant
SKU #B				SIP with two UFL connectors	Taoglas ant+Taoglas ant/ ethertronic printed ant+ethertronic printed ant

2. The antenna configurations as following table:

Module Version	Primary TX/RX antenna	RX diversity antenna
SKU #A	Chip Antenna Lantronix 220-613-R Ethertronics M830510	U.FL to PCB Strip Antenna Lantronix 930-099-R Ethertronics 1000602
SKU #A	Chip Antenna Lantronix 220-613-R Ethertronics M830510	U.FL to Taoglas GW.71.5153
SKU #B	U.FL to PCB Strip Antenna Lantronix 930-099-R Ethertronics 1000602	U.FL to PCB Strip Antenna Lantronix 930-099-R Ethertronics 1000602
SKU #B	U.FL to Taoglas GW.71.5153	U.FL to Taoglas GW.71.5153

3. WLAN and BT technology can't transmit at same time.

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

Brand	Model	Antenna Gain (dBi) (Excelude cable loss)	Cable Loss (dB)	Net Gain (dBi)	Cable Length (mm)	Frequency range (GHz to GHz)	Antenna Type	Connecter Type
taoglas	GW.71.5153	3.8	1	2.8	45	2.4~2.483	Dipole	R-SMA
		5.5	1.7	3.8		5.15~5.85		
Brand	Model	Antenna Gain (dBi)				Frequency range (GHz to GHz)	Antenna Type	Connecter Type
ethertronics	M830510	1.1				2.4~2.483	Chip	NA
		3.2				5.15~5.85		
Brand	Model	Antenna Gain (dBi)				Frequency range (GHz to GHz)	Antenna Type	Connecter Type
ethertronics	1000602	2.5				2.4~2.483	PCB	i-pex(MHF)
		5				5.15~5.85		

5. 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	√	√	-	-	Chip antenna + Dipole antenna
2	√	√	√	-	PCB antenna + PCB antenna
3	√	√	-	√	Dipole antenna + 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: "-"means no effect.

NOTE 2: Antenna placement had been invesitagated on the positioned of each 3 axis.
Following worst case were found as listed below.

Antenna	Worst position
Chip	X Plane
PCB	X-plane(Below 1GHz) ; Z-plane (Above 1GHz)

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION 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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0	FHSS	8DPSK	3DH5

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0	FHSS	8DPSK	3DH5

Antenna Port Conducted Measurement:

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

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION 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	24deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
RE<1G	25deg. C, 69%RH	120Vac, 60Hz	Robert Cheng
PLC	25deg. C, 65%RH	120Vac, 60Hz	JyunChun.Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

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.

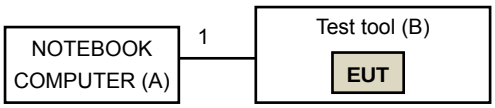
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	NOTEBOOK COMPUTER	DELL	E5430	GM1SKV1	FCC DoC	Provided by Lab
B.	Test Tool	NA	NA	NA	NA	Supplied by Client

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	MiniUSB	1	1.5	Yes	0	Provided by Lab

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 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

For above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 09, 2015	Feb. 08, 2016
RF Cable	8D-FB	CHHCAB-001-1 CHHCAB-001-2	Oct. 04, 2015	Oct. 03, 2016
	RF-141	CHHCAB-004	Oct. 04, 2015	Oct. 03, 2016
Horn_Antenna AISI	AIH.8018	0000220091110	Feb. 06, 2015	Feb. 05, 2016
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131213 131215 SNMY23685/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	Jun. 26, 2015	Jun 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Spectrum Analyzer R&S	FSP40	100060	May 08, 2015	May 07, 2016
Power Meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power Sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. H.
3. The FCC Site Registration No. is 797305.
4. The CANADA Site Registration No. is IC 7450H-3.
5. Tested Date: Oct. 06 to 12, 2015

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 24, 2015	July 23, 2016
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 06, 2015	Feb. 05, 2016
RF Cable	8D-FB	CHGCAB-001 -1 CHGCAB-001 -2	Oct. 03, 2015	Oct. 02, 2016
	RF-141	CHGCAB-004	Oct. 03, 2015	Oct. 02, 2016
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The CANADA Site Registration No. is IC 7450H-2.
5. Tested Date: Oct. 08, 2015

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note:

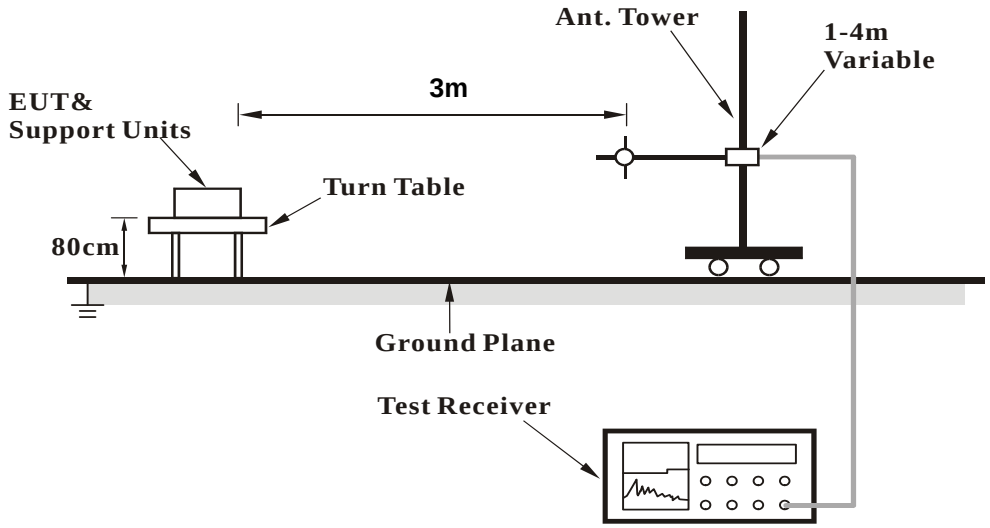
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. For Average measurement, due to 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, therefore Average value = peak reading + 20log(duty cycle).
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

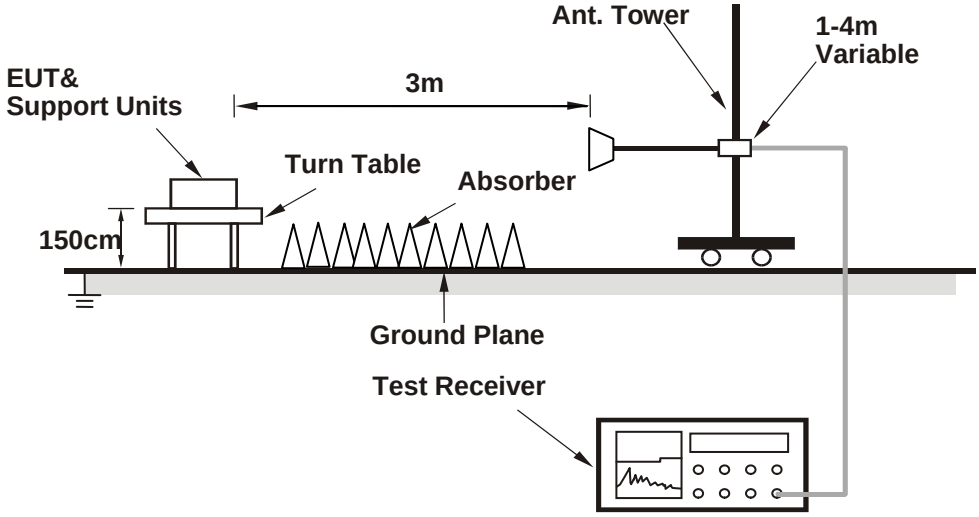
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on test table.
2. The communication partner run test program “HyperTerminal paste Script file” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 Test Results (Mode 1)

Above 1GHz Data

BT_GFSK

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK)
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	46.3 PK	74.0	-27.7	1.40 H	198	49.49	-3.19
2	2390.00	16.2 AV	54.0	-37.8	1.40 H	198	19.39	-3.19
3	*2402.00	107.2 PK			1.40 H	198	110.36	-3.16
4	*2402.00	77.1 AV			1.40 H	198	80.26	-3.16
5	4804.00	46.8 PK	74.0	-27.2	1.24 H	252	40.86	5.94
6	4804.00	16.7 AV	54.0	-37.3	1.24 H	252	10.76	5.94
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	45.2 PK	74.0	-28.8	2.38 V	182	48.39	-3.19
2	2390.00	15.1 AV	54.0	-38.9	2.38 V	182	18.29	-3.19
3	*2402.00	101.7 PK			2.38 V	182	104.86	-3.16
4	*2402.00	71.6 AV			2.38 V	182	74.76	-3.16
5	4804.00	48.4 PK	74.0	-25.6	1.00 V	127	42.46	5.94
6	4804.00	18.3 AV	54.0	-35.7	1.00 V	127	12.36	5.94

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
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	104.8 PK			1.41 H	188	107.82	-3.02
2	*2441.00	74.7 AV			1.41 H	188	77.72	-3.02
3	4882.00	47.7 PK	74.0	-26.3	1.16 H	234	41.65	6.05
4	4882.00	17.6 AV	54.0	-36.4	1.16 H	234	11.55	6.05
5	7323.00	52.5 PK	74.0	-21.5	1.27 H	298	41.48	11.02
6	7323.00	22.4 AV	54.0	-31.6	1.27 H	298	11.38	11.02
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	99.4 PK			2.31 V	184	102.42	-3.02
2	*2441.00	69.3 AV			2.31 V	184	72.32	-3.02
3	4882.00	47.5 PK	74.0	-26.5	1.00 V	128	41.45	6.05
4	4882.00	17.4 AV	54.0	-36.6	1.00 V	128	11.35	6.05
5	7323.00	52.2 PK	74.0	-21.8	1.00 V	132	41.18	11.02
6	7323.00	22.1 AV	54.0	-31.9	1.00 V	132	11.08	11.02

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
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	104.1 PK			1.40 H	185	106.98	-2.88
2	*2480.00	74.0 AV			1.40 H	185	76.88	-2.88
3	2483.50	46.3 PK	74.0	-27.7	1.40 H	185	49.17	-2.87
4	2483.50	16.2 AV	54.0	-37.8	1.40 H	185	19.07	-2.87
5	4960.00	47.4 PK	74.0	-26.6	1.18 H	237	41.36	6.04
6	4960.00	17.3 AV	54.0	-36.7	1.18 H	237	11.26	6.04
7	7440.00	52.7 PK	74.0	-21.3	1.35 H	275	40.97	11.73
8	7440.00	22.6 AV	54.0	-31.4	1.35 H	275	10.87	11.73
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	98.2 PK			2.24 V	181	101.08	-2.88
2	*2480.00	68.1 AV			2.24 V	181	70.98	-2.88
3	2483.50	45.3 PK	74.0	-28.7	2.24 V	181	48.17	-2.87
4	2483.50	15.2 AV	54.0	-38.8	2.24 V	181	18.07	-2.87
5	4960.00	47.5 PK	74.0	-26.5	1.00 V	126	41.46	6.04
6	4960.00	17.4 AV	54.0	-36.6	1.00 V	126	11.36	6.04
7	7440.00	52.8 PK	74.0	-21.2	1.00 V	134	41.07	11.73
8	7440.00	22.7 AV	54.0	-31.3	1.00 V	134	10.97	11.73

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. Average value = peak reading + 20log(duty cycle).

BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
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	46.2 PK	74.0	-27.8	1.41 H	200	49.39	-3.19
2	2390.00	16.1 AV	54.0	-37.9	1.41 H	200	19.29	-3.19
3	*2402.00	107.3 PK			1.41 H	200	110.46	-3.16
4	*2402.00	77.2 AV			1.41 H	200	80.36	-3.16
5	4804.00	47.1 PK	74.0	-26.9	1.24 H	261	41.16	5.94
6	4804.00	17.0 AV	54.0	-37.0	1.24 H	261	11.06	5.94
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	44.9 PK	74.0	-29.1	2.55 V	176	48.09	-3.19
2	2390.00	14.8 AV	54.0	-39.2	2.55 V	176	17.99	-3.19
3	*2402.00	101.4 PK			2.55 V	176	104.56	-3.16
4	*2402.00	71.3 AV			2.55 V	176	74.46	-3.16
5	4804.00	48.2 PK	74.0	-25.8	1.00 V	125	42.26	5.94
6	4804.00	18.1 AV	54.0	-35.9	1.00 V	125	12.16	5.94

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
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	104.9 PK			1.45 H	183	107.92	-3.02
2	*2441.00	74.8 AV			1.45 H	183	77.82	-3.02
3	4882.00	46.9 PK	74.0	-27.1	1.19 H	249	40.85	6.05
4	4882.00	16.8 AV	54.0	-37.2	1.19 H	249	10.75	6.05
5	7323.00	52.6 PK	74.0	-21.4	1.35 H	278	41.58	11.02
6	7323.00	22.5 AV	54.0	-31.5	1.35 H	278	11.48	11.02
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	99.7 PK			2.52 V	179	102.72	-3.02
2	*2441.00	69.6 AV			2.52 V	179	72.62	-3.02
3	4882.00	47.7 PK	74.0	-26.3	1.00 V	117	41.65	6.05
4	4882.00	17.6 AV	54.0	-36.4	1.00 V	117	11.55	6.05
5	7323.00	52.9 PK	74.0	-21.1	1.00 V	130	41.88	11.02
6	7323.00	22.8 AV	54.0	-31.2	1.00 V	130	11.78	11.02

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
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	104.2 PK			1.36 H	189	107.08	-2.88
2	*2480.00	74.1 AV			1.36 H	189	76.98	-2.88
3	2483.50	46.7 PK	74.0	-27.3	1.36 H	189	49.57	-2.87
4	2483.50	16.6 AV	54.0	-37.4	1.36 H	189	19.47	-2.87
5	4960.00	47.2 PK	74.0	-26.8	1.21 H	237	41.16	6.04
6	4960.00	17.1 AV	54.0	-36.9	1.21 H	237	11.06	6.04
7	7440.00	52.4 PK	74.0	-21.6	1.29 H	284	40.67	11.73
8	7440.00	22.3 AV	54.0	-31.7	1.29 H	284	10.57	11.73
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	98.8 PK			2.55 V	177	101.68	-2.88
2	*2480.00	68.7 AV			2.55 V	177	71.58	-2.88
3	2483.50	45.4 PK	74.0	-28.6	2.55 V	177	48.27	-2.87
4	2483.50	15.3 AV	54.0	-38.7	2.55 V	177	18.17	-2.87
5	4960.00	47.6 PK	74.0	-26.4	1.00 V	123	41.56	6.04
6	4960.00	17.5 AV	54.0	-36.5	1.00 V	123	11.46	6.04
7	7440.00	52.2 PK	74.0	-21.8	1.00 V	132	40.47	11.73
8	7440.00	22.1 AV	54.0	-31.9	1.00 V	132	10.37	11.73

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. Average value = peak reading + 20log(duty cycle).

Below 1GHz Data

BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	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	61.14	30.2 QP	40.0	-9.8	1.42 H	291	44.15	-13.97
2	165.64	37.1 QP	43.5	-6.4	1.37 H	192	50.34	-13.26
3	232.31	38.3 QP	46.0	-7.7	1.17 H	205	53.54	-15.24
4	752.21	42.2 QP	46.0	-3.9	1.15 H	204	43.32	-1.17
5	817.40	41.1 QP	46.0	-4.9	1.23 H	232	41.40	-0.26
6	841.14	40.3 QP	46.0	-5.7	1.52 H	293	40.46	-0.13
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	61.65	34.4 QP	40.0	-5.6	1.18 V	75	48.61	-14.17
2	165.64	34.6 QP	43.5	-8.9	1.15 V	211	47.83	-13.26
3	676.43	42.5 QP	46.0	-3.5	1.34 V	204	45.64	-3.10
4	753.15	41.1 QP	46.0	-4.9	1.75 V	116	42.24	-1.14
5	768.62	39.4 QP	46.0	-6.6	1.50 V	74	40.48	-1.06
6	818.62	40.1 QP	46.0	-5.9	1.15 V	56	40.37	-0.23

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

4.1.8 Test Results (Mode 2)

Above 1GHz Data

BT_GFSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
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	45.8 PK	74.0	-28.2	1.09 H	298	48.99	-3.19
2	2390.00	15.7 AV	54.0	-38.3	1.09 H	298	18.89	-3.19
3	*2402.00	105.1 PK			1.09 H	298	108.26	-3.16
4	*2402.00	75.0 AV			1.09 H	298	78.16	-3.16
5	4804.00	47.7 PK	74.0	-26.3	1.24 H	240	41.76	5.94
6	4804.00	17.6 AV	54.0	-36.4	1.24 H	240	11.66	5.94
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	46.0 PK	74.0	-28.0	1.04 V	194	49.19	-3.19
2	2390.00	15.9 AV	54.0	-38.1	1.04 V	194	19.09	-3.19
3	*2402.00	98.7 PK			1.04 V	194	101.86	-3.16
4	*2402.00	68.6 AV			1.04 V	194	71.76	-3.16
5	4804.00	47.8 PK	74.0	-26.2	1.21 V	141	41.86	5.94
6	4804.00	17.7 AV	54.0	-36.3	1.21 V	141	11.76	5.94

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
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	104.5 PK			1.04 H	297	107.52	-3.02
2	*2441.00	74.4 AV			1.04 H	297	77.42	-3.02
3	4882.00	47.4 PK	74.0	-26.6	1.16 H	247	41.35	6.05
4	4882.00	17.3 AV	54.0	-36.7	1.16 H	247	11.25	6.05
5	7323.00	52.3 PK	74.0	-21.7	1.31 H	301	41.28	11.02
6	7323.00	22.2 AV	54.0	-31.8	1.31 H	301	11.18	11.02
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	97.8 PK			1.04 V	184	100.82	-3.02
2	*2441.00	67.7 AV			1.04 V	184	70.72	-3.02
3	4882.00	48.2 PK	74.0	-25.8	1.21 V	126	42.15	6.05
4	4882.00	18.1 AV	54.0	-35.9	1.21 V	126	12.05	6.05
5	7323.00	52.4 PK	74.0	-21.6	1.42 V	208	41.38	11.02
6	7323.00	22.3 AV	54.0	-31.7	1.42 V	208	11.28	11.02

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
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			1.08 H	295	105.28	-2.88
2	*2480.00	72.3 AV			1.08 H	295	75.18	-2.88
3	2483.50	45.8 PK	74.0	-28.2	1.08 H	295	48.67	-2.87
4	2483.50	15.7 AV	54.0	-38.3	1.08 H	295	18.57	-2.87
5	4960.00	48.0 PK	74.0	-26.0	1.18 H	252	41.96	6.04
6	4960.00	17.9 AV	54.0	-36.1	1.18 H	252	11.86	6.04
7	7440.00	52.4 PK	74.0	-21.6	1.33 H	303	40.67	11.73
8	7440.00	22.3 AV	54.0	-31.7	1.33 H	303	10.57	11.73
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	96.1 PK			1.08 V	193	98.98	-2.88
2	*2480.00	66.0 AV			1.08 V	193	68.88	-2.88
3	2483.50	45.8 PK	74.0	-28.2	1.08 V	193	48.67	-2.87
4	2483.50	15.7 AV	54.0	-38.3	1.08 V	193	18.57	-2.87
5	4960.00	48.5 PK	74.0	-25.5	1.18 V	116	42.46	6.04
6	4960.00	18.4 AV	54.0	-35.6	1.18 V	116	12.36	6.04
7	7440.00	52.6 PK	74.0	-21.4	1.38 V	196	40.87	11.73
8	7440.00	22.5 AV	54.0	-31.5	1.38 V	196	10.77	11.73

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. Average value = peak reading + 20log(duty cycle).

BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
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	46.0 PK	74.0	-28.0	1.10 H	284	49.19	-3.19
2	2390.00	15.9 AV	54.0	-38.1	1.10 H	284	19.09	-3.19
3	*2402.00	105.5 PK			1.10 H	284	108.66	-3.16
4	*2402.00	75.4 AV			1.10 H	284	78.56	-3.16
5	4804.00	47.9 PK	74.0	-26.1	1.18 H	245	41.96	5.94
6	4804.00	17.8 AV	54.0	-36.2	1.18 H	245	11.86	5.94
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	45.0 PK	74.0	-29.0	1.10 V	177	48.19	-3.19
2	2390.00	14.9 AV	54.0	-39.1	1.10 V	177	18.09	-3.19
3	*2402.00	98.5 PK			1.10 V	177	101.66	-3.16
4	*2402.00	68.4 AV			1.10 V	177	71.56	-3.16
5	4804.00	48.2 PK	74.0	-25.8	1.16 V	123	42.26	5.94
6	4804.00	18.1 AV	54.0	-35.9	1.16 V	123	12.16	5.94

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
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	104.3 PK			1.07 H	286	107.32	-3.02
2	*2441.00	74.2 AV			1.07 H	286	77.22	-3.02
3	4882.00	48.1 PK	74.0	-25.9	1.22 H	241	42.05	6.05
4	4882.00	18.0 AV	54.0	-36.0	1.22 H	241	11.95	6.05
5	7323.00	52.3 PK	74.0	-21.7	1.36 H	315	41.28	11.02
6	7323.00	22.2 AV	54.0	-31.8	1.36 H	315	11.18	11.02
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	98.2 PK			1.08 V	167	101.22	-3.02
2	*2441.00	68.1 AV			1.08 V	167	71.12	-3.02
3	4882.00	47.7 PK	74.0	-26.3	1.15 V	121	41.65	6.05
4	4882.00	17.6 AV	54.0	-36.4	1.15 V	121	11.55	6.05
5	7323.00	52.4 PK	74.0	-21.6	1.38 V	205	41.38	11.02
6	7323.00	22.3 AV	54.0	-31.7	1.38 V	205	11.28	11.02

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
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	102.5 PK			1.15 H	306	105.38	-2.88
2	*2480.00	72.4 AV			1.15 H	306	75.28	-2.88
3	2483.50	46.3 PK	74.0	-27.7	1.15 H	306	49.17	-2.87
4	2483.50	16.2 AV	54.0	-37.8	1.15 H	306	19.07	-2.87
5	4960.00	48.3 PK	74.0	-25.7	1.23 H	223	42.26	6.04
6	4960.00	18.2 AV	54.0	-35.8	1.23 H	223	12.16	6.04
7	7440.00	52.5 PK	74.0	-21.5	1.28 H	296	40.77	11.73
8	7440.00	22.4 AV	54.0	-31.6	1.28 H	296	10.67	11.73
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	96.3 PK			1.05 V	177	99.18	-2.88
2	*2480.00	66.2 AV			1.05 V	177	69.08	-2.88
3	2483.50	45.8 PK	74.0	-28.2	1.05 V	177	48.67	-2.87
4	2483.50	15.7 AV	54.0	-38.3	1.05 V	177	18.57	-2.87
5	4960.00	48.1 PK	74.0	-25.9	1.21 V	116	42.06	6.04
6	4960.00	18.0 AV	54.0	-36.0	1.21 V	116	11.96	6.04
7	7440.00	52.1 PK	74.0	-21.9	1.37 V	177	40.37	11.73
8	7440.00	22.0 AV	54.0	-32.0	1.37 V	177	10.27	11.73

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. Average value = peak reading + 20log(duty cycle).

Below 1GHz Data

BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	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	90.30	31.1 QP	43.5	-12.5	1.13 H	60	49.86	-18.81
2	165.64	36.2 QP	43.5	-7.3	1.00 H	52	49.43	-13.26
3	432.49	40.1 QP	46.0	-5.9	1.18 H	56	48.29	-8.18
4	552.16	39.6 QP	46.0	-6.4	1.40 H	5	45.38	-5.76
5	806.18	41.3 QP	46.0	-4.7	1.22 H	321	41.80	-0.51
6	942.32	40.2 QP	46.0	-5.9	1.43 H	108	38.64	1.51
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	81.67	34.3 QP	40.0	-5.7	1.32 V	121	52.37	-18.07
2	265.27	42.4 QP	46.0	-3.6	1.20 V	227	55.81	-13.39
3	476.21	42.4 QP	46.0	-3.6	2.48 V	117	49.72	-7.33
4	553.19	41.1 QP	46.0	-4.9	1.37 V	290	46.80	-5.74
5	668.48	42.3 QP	46.0	-3.7	1.03 V	319	45.56	-3.30
6	718.20	40.2 QP	46.0	-5.8	1.44 V	247	42.78	-2.54

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

4.1.9 Test Results(Mode 3)

Above 1GHz Data

BT_GFSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
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	45.1 PK	74.0	-28.9	1.37 H	100	48.29	-3.19
2	2390.00	15.0 AV	54.0	-39.0	1.37 H	100	18.19	-3.19
3	*2402.00	96.4 PK			1.37 H	100	99.56	-3.16
4	*2402.00	66.3 AV			1.37 H	100	69.46	-3.16
5	4804.00	47.9 PK	74.0	-26.1	1.23 H	244	41.96	5.94
6	4804.00	17.8 AV	54.0	-36.2	1.23 H	244	11.86	5.94
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	46.0 PK	74.0	-28.0	1.30 V	138	49.19	-3.19
2	2390.00	15.9 AV	54.0	-38.1	1.30 V	138	19.09	-3.19
3	*2402.00	104.9 PK			1.30 V	138	108.06	-3.16
4	*2402.00	74.8 AV			1.30 V	138	77.96	-3.16
5	4804.00	47.8 PK	74.0	-26.2	1.17 V	134	41.86	5.94
6	4804.00	17.7 AV	54.0	-36.3	1.17 V	134	11.76	5.94

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
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	95.4 PK			1.41 H	85	98.42	-3.02
2	*2441.00	65.3 AV			1.41 H	85	68.32	-3.02
3	4882.00	48.1 PK	74.0	-25.9	1.20 H	242	42.05	6.05
4	4882.00	18.0 AV	54.0	-36.0	1.20 H	242	11.95	6.05
5	7323.00	52.1 PK	74.0	-21.9	1.22 H	299	41.08	11.02
6	7323.00	22.0 AV	54.0	-32.0	1.22 H	299	10.98	11.02
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	104.0 PK			1.30 V	138	107.02	-3.02
2	*2441.00	73.9 AV			1.30 V	138	76.92	-3.02
3	4882.00	47.9 PK	74.0	-26.1	1.18 V	120	41.85	6.05
4	4882.00	17.8 AV	54.0	-36.2	1.18 V	120	11.75	6.05
5	7323.00	52.7 PK	74.0	-21.3	1.40 V	195	41.68	11.02
6	7323.00	22.6 AV	54.0	-31.4	1.40 V	195	11.58	11.02

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
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	93.1 PK			1.37 H	98	95.98	-2.88
2	*2480.00	63.0 AV			1.37 H	98	65.88	-2.88
3	2483.50	48.4 PK	74.0	-25.6	1.37 H	98	51.27	-2.87
4	2483.50	18.3 AV	54.0	-35.7	1.37 H	98	21.17	-2.87
5	4960.00	48.6 PK	74.0	-25.4	1.28 H	249	42.56	6.04
6	4960.00	18.5 AV	54.0	-35.5	1.28 H	249	12.46	6.04
7	7440.00	52.1 PK	74.0	-21.9	1.22 H	287	40.37	11.73
8	7440.00	22.0 AV	54.0	-32.0	1.22 H	287	10.27	11.73
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	101.6 PK			1.30 V	138	104.48	-2.88
2	*2480.00	71.5 AV			1.30 V	138	74.38	-2.88
3	2483.50	48.6 PK	74.0	-25.4	1.30 V	138	51.47	-2.87
4	2483.50	18.5 AV	54.0	-35.5	1.30 V	138	21.37	-2.87
5	4960.00	48.2 PK	74.0	-25.8	1.27 V	146	42.16	6.04
6	4960.00	18.1 AV	54.0	-35.9	1.27 V	146	12.06	6.04
7	7440.00	52.5 PK	74.0	-21.5	1.33 V	215	40.77	11.73
8	7440.00	22.4 AV	54.0	-31.6	1.33 V	215	10.67	11.73

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. Average value = peak reading + 20log(duty cycle).

BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
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	45.9 PK	74.0	-28.1	1.32 H	89	49.09	-3.19
2	2390.00	15.8 AV	54.0	-38.2	1.32 H	89	18.99	-3.19
3	*2402.00	96.6 PK			1.32 H	89	99.76	-3.16
4	*2402.00	66.5 AV			1.32 H	89	69.66	-3.16
5	4804.00	47.5 PK	74.0	-26.5	1.22 H	238	41.56	5.94
6	4804.00	17.4 AV	54.0	-36.6	1.22 H	238	11.46	5.94
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	46.1 PK	74.0	-27.9	1.59 V	123	49.29	-3.19
2	2390.00	16.0 AV	54.0	-38.0	1.59 V	123	19.19	-3.19
3	*2402.00	104.6 PK			1.59 V	123	107.76	-3.16
4	*2402.00	74.5 AV			1.59 V	123	77.66	-3.16
5	4804.00	48.1 PK	74.0	-25.9	1.25 V	120	42.16	5.94
6	4804.00	18.0 AV	54.0	-36.0	1.25 V	120	12.06	5.94

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
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	95.8 PK			1.42 H	92	98.82	-3.02
2	*2441.00	65.7 AV			1.42 H	92	68.72	-3.02
3	4882.00	47.7 PK	74.0	-26.3	1.21 H	229	41.65	6.05
4	4882.00	17.6 AV	54.0	-36.4	1.21 H	229	11.55	6.05
5	7323.00	51.7 PK	74.0	-22.3	1.30 H	294	40.68	11.02
6	7323.00	21.6 AV	54.0	-32.4	1.30 H	294	10.58	11.02
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	103.6 PK			1.50 V	135	106.62	-3.02
2	*2441.00	73.5 AV			1.50 V	135	76.52	-3.02
3	4882.00	47.6 PK	74.0	-26.4	1.21 V	131	41.55	6.05
4	4882.00	17.5 AV	54.0	-36.5	1.21 V	131	11.45	6.05
5	7323.00	52.2 PK	74.0	-21.8	1.38 V	198	41.18	11.02
6	7323.00	22.1 AV	54.0	-31.9	1.38 V	198	11.08	11.02

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. Average value = peak reading + 20log(duty cycle).

CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
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	94.4 PK			1.34 H	94	97.28	-2.88
2	*2480.00	64.3 AV			1.34 H	94	67.18	-2.88
3	2483.50	47.8 PK	74.0	-26.2	1.34 H	94	50.67	-2.87
4	2483.50	17.7 AV	54.0	-36.3	1.34 H	94	20.57	-2.87
5	4960.00	48.1 PK	74.0	-25.9	1.19 H	252	42.06	6.04
6	4960.00	18.0 AV	54.0	-36.0	1.19 H	252	11.96	6.04
7	7440.00	52.8 PK	74.0	-21.2	1.26 H	284	41.07	11.73
8	7440.00	22.7 AV	54.0	-31.3	1.26 H	284	10.97	11.73
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	102.3 PK			1.51 V	135	105.18	-2.88
2	*2480.00	72.2 AV			1.51 V	135	75.08	-2.88
3	2483.50	48.0 PK	74.0	-26.0	1.51 V	135	50.87	-2.87
4	2483.50	17.9 AV	54.0	-36.1	1.51 V	135	20.77	-2.87
5	4960.00	48.1 PK	74.0	-25.9	1.20 V	119	42.06	6.04
6	4960.00	18.0 AV	54.0	-36.0	1.20 V	119	11.96	6.04
7	7440.00	51.9 PK	74.0	-22.1	1.36 V	193	40.17	11.73
8	7440.00	21.8 AV	54.0	-32.2	1.36 V	193	10.07	11.73

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. Average value = peak reading + 20log(duty cycle).

Below 1GHz Data

BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	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	61.31	30.1 QP	40.0	-9.9	1.24 H	223	44.12	-14.04
2	165.73	37.3 QP	43.5	-6.2	1.11 H	232	50.54	-13.28
3	232.52	38.2 QP	46.0	-7.8	1.67 H	66	53.39	-15.21
4	**752.15**	**42.6 QP**	**46.0**	**-3.4**	**1.34 H**	**74**	**43.78**	**-1.18**
5	817.23	41.3 QP	46.0	-4.7	1.41 H	312	41.58	-0.27
6	841.32	40.2 QP	46.0	-5.8	1.24 H	255	40.30	-0.13
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	61.73	34.3 QP	40.0	-5.7	1.15 V	100	48.45	-14.19
2	165.30	34.5 QP	43.5	-9.0	1.14 V	110	47.71	-13.22
3	676.07	42.4 QP	46.0	-3.6	1.53 V	289	45.54	-3.12
4	753.26	41.1 QP	46.0	-4.9	1.52 V	294	42.24	-1.14
5	768.54	39.3 QP	46.0	-6.7	1.34 V	190	40.37	-1.05
6	818.22	40.3 QP	46.0	-5.7	1.52 V	293	40.57	-0.24

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

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	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 11, 2015	June 10, 2016
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software BVADT	BVADT_Cond_ V7.3.7.3	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 Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Aug. 21, 2015

4.2.3 Test Procedures

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

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

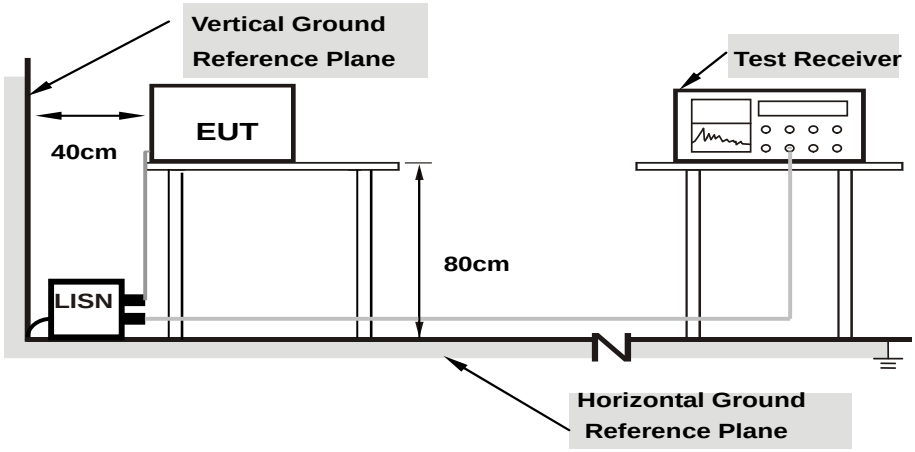
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation From Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

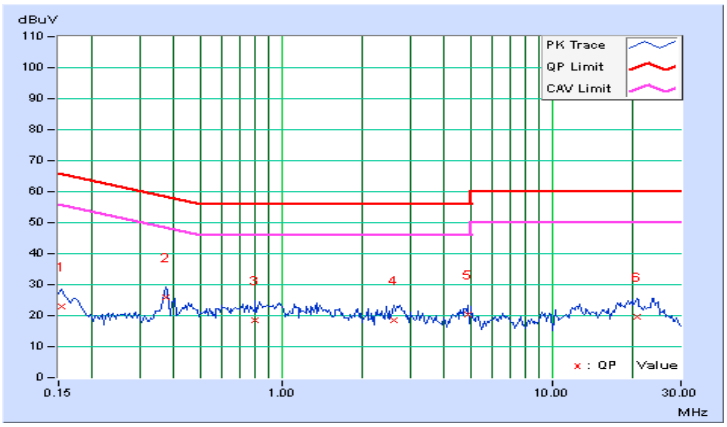
4.2.7 Test Results

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

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	0.08	22.88	16.90	22.96	16.98	65.79	55.79	-42.83	-38.81
2	0.37266	0.10	25.74	22.22	25.84	22.32	58.44	48.44	-32.60	-26.12
3	0.79844	0.12	18.56	12.20	18.68	12.32	56.00	46.00	-37.32	-33.68
4	2.59766	0.18	18.28	13.12	18.46	13.30	56.00	46.00	-37.54	-32.70
5	4.91016	0.25	20.16	9.52	20.41	9.77	56.00	46.00	-35.59	-36.23
6	20.63672	0.71	18.98	14.24	19.69	14.95	60.00	50.00	-40.31	-35.05

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.

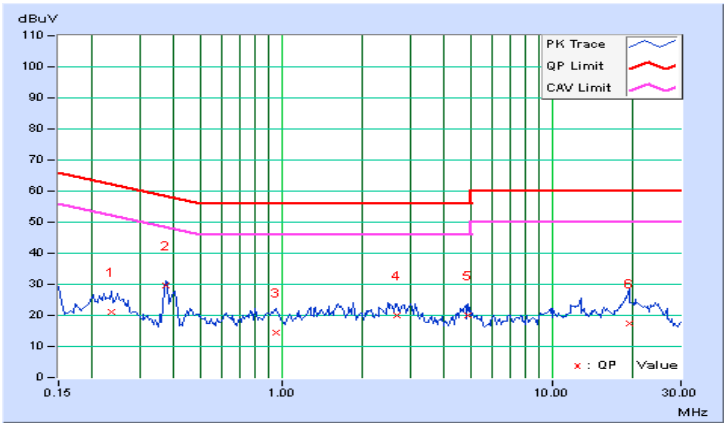


Phase	Neutral (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.23594	0.08	20.94	17.64	21.02	17.72	62.24	52.24	-41.21	-34.51
2	**0.37603**	**0.10**	**29.54**	**28.74**	**29.64**	**28.84**	**58.37**	**48.37**	**-28.73**	**-19.53**
3	0.95078	0.13	14.40	10.38	14.53	10.51	56.00	46.00	-41.47	-35.49
4	2.67188	0.19	19.66	11.92	19.85	12.11	56.00	46.00	-36.15	-33.89
5	4.92188	0.27	19.90	9.62	20.17	9.89	56.00	46.00	-35.83	-36.11
6	19.29297	0.72	16.82	13.10	17.54	13.82	60.00	50.00	-42.46	-36.18

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.

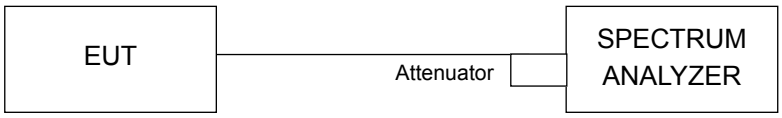


4.3 Number of Hopping Frequency Used

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.

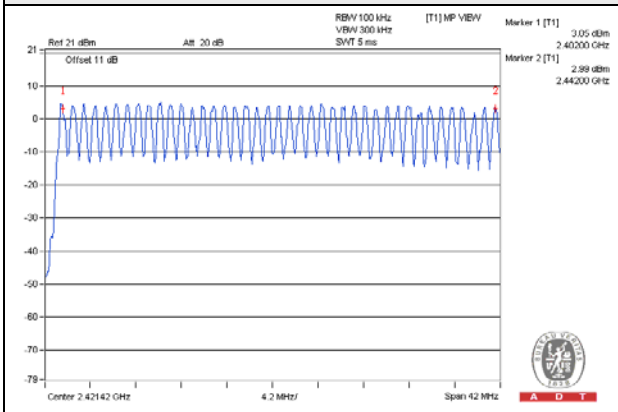
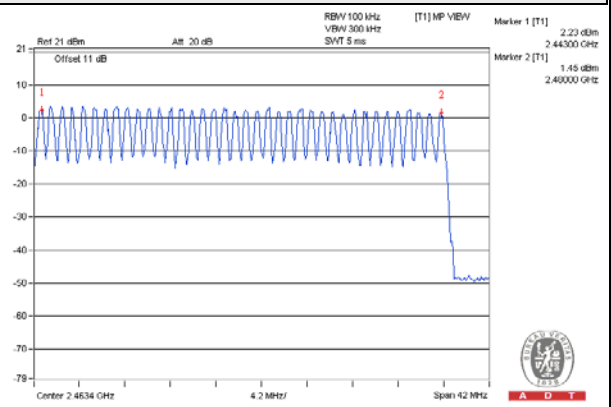
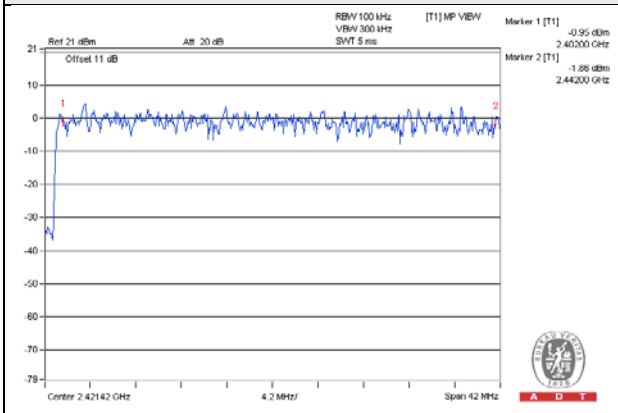
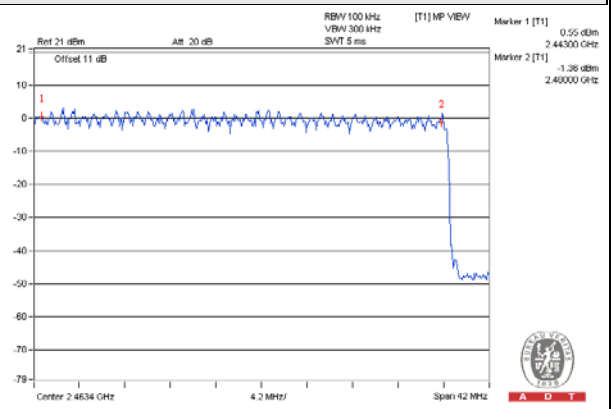
e. Repeat above procedures until all frequencies measured were complete.

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.

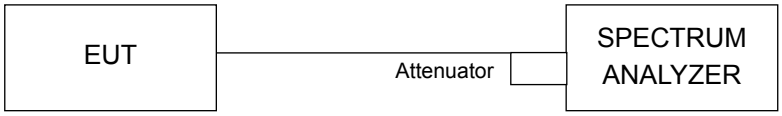
GFSK
 
8DPSK
 

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.

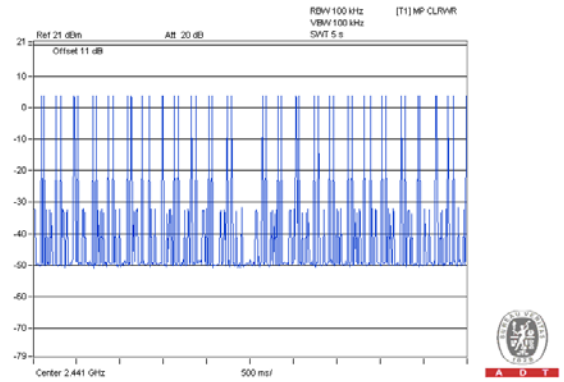
4.4.6 Test Results

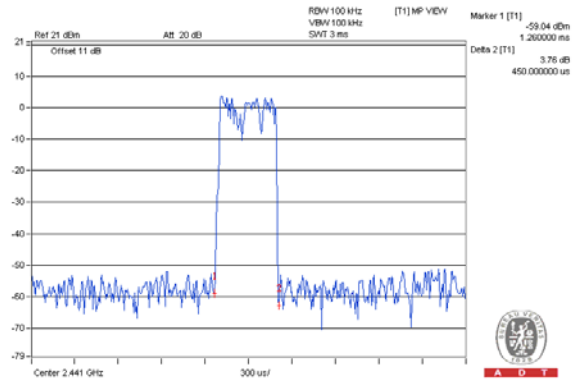
GFSK

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	46 (times / 5 sec) * 6.32 = 290.72 times	0.45	130.82	400
DH3	17 (times / 5 sec) * 6.32 = 107.44 times	1.75	188.02	400
DH5	16 (times / 5 sec) * 6.32 = 101.12 times	3.04	307.4	400

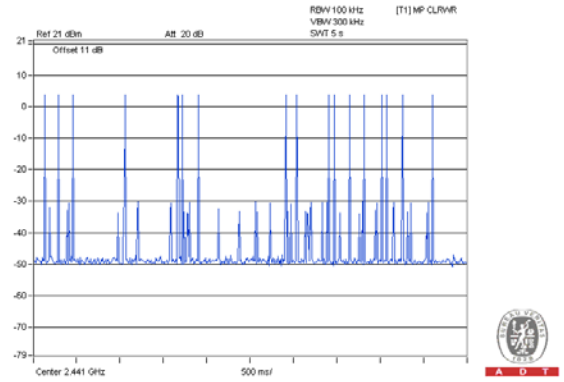
NOTE: Test plots of the transmitting time slot are shown on next page.

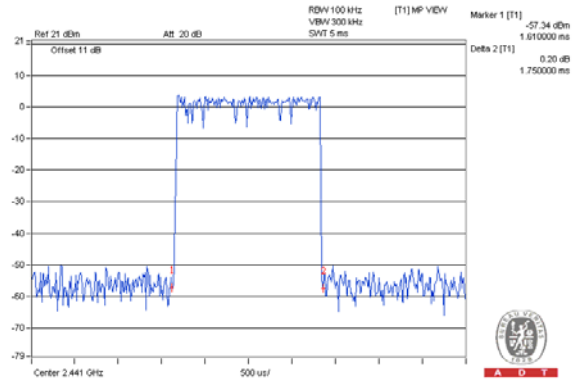
DH1


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

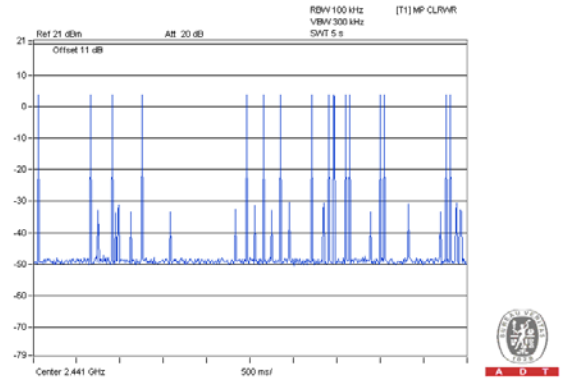

RBW 100 kHz
VBW 100 kHz
SWT 3 ms
[T1] MP VIEW
Marker 1 [T1]
-59.04 dBm
1.260000 ms
Delta 2 [T1]
3.76 dB
450.000000 us
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
300 us/

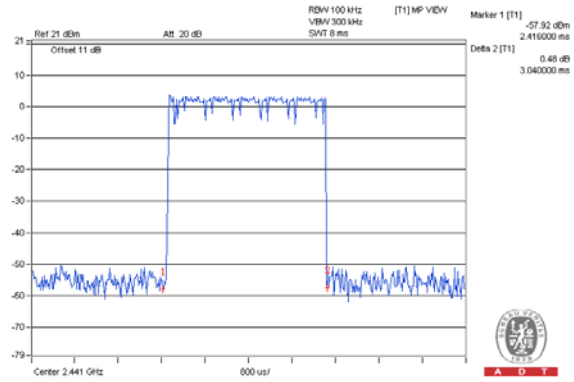
DH3


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
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
Marker 1 [T1]
-57.34 dBm
1.610000 ms
Delta 2 [T1]
0.20 dB
1.750000 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
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
500 ms/

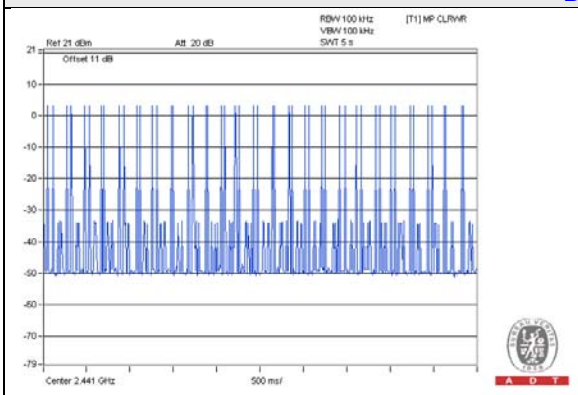

RBW 100 kHz
VBW 300 kHz
SWT 8 ms
[T1] MP VIEW
Marker 1 [T1]
-57.92 dBm
2.416000 ms
Delta 2 [T1]
0.48 dB
3.040000 ms
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
800 us/

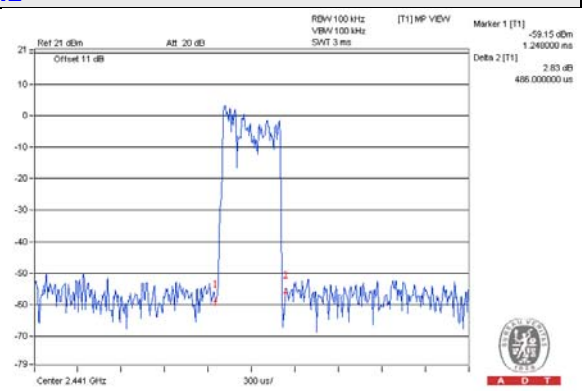
8DPSK

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) * 6.32 = 316 times	0.486	153.58	400
DH3	18 (times / 5 sec) * 6.32 = 113.76 times	1.73	196.8	400
DH5	16 (times / 5 sec) * 6.32 = 101.12 times	3.056	309.02	400

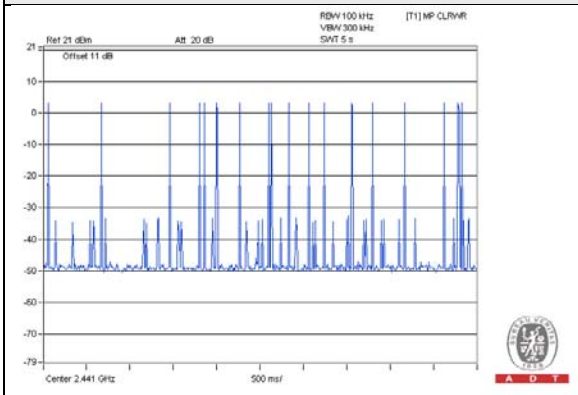
NOTE: Test plots of the transmitting time slot are shown on next page.

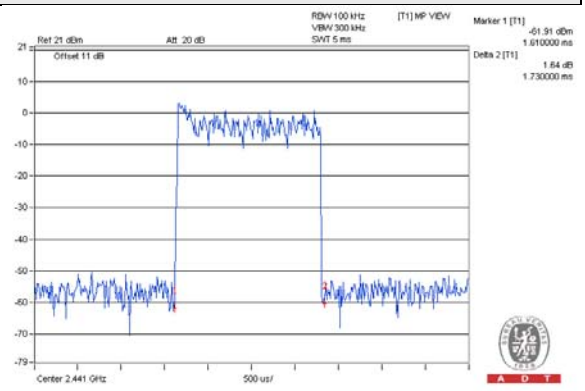
DH1


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

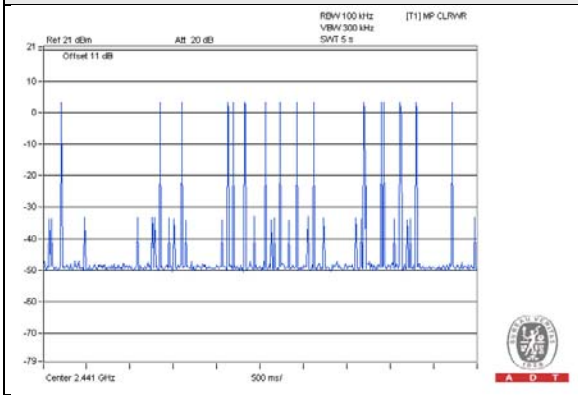

RBW 100 kHz
VBW 100 kHz
SWT 3 ms
[T1] MP VIEW
Marker 1 [T1]
-59.15 dBm
1.240000 ms
Delta 2 [T1]
2.83 dB
486.000000 us
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
300 us/

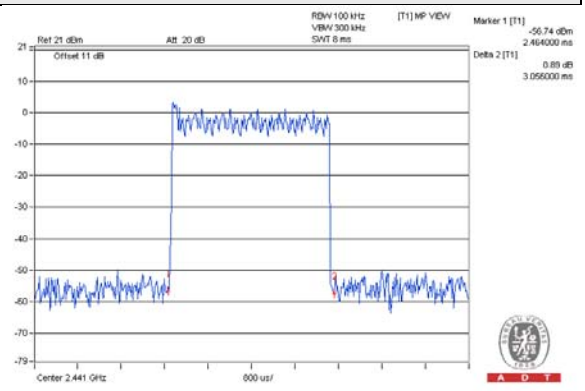
DH3


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
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
Marker 1 [T1]
-61.91 dBm
1.610000 ms
Delta 2 [T1]
1.64 dB
1.730000 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
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
500 ms/

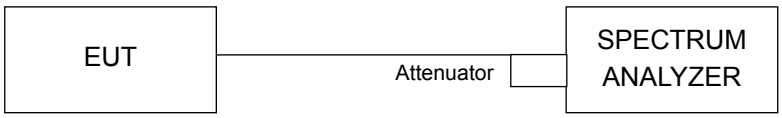

RBW 100 kHz
VBW 300 kHz
SWT 8 ms
[T1] MP VIEW
Marker 1 [T1]
-56.74 dBm
2.464000 ms
Delta 2 [T1]
0.89 dB
3.056000 ms
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.441 GHz
800 us/

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. Repeat above procedures until all frequencies measured were complete.

4.5.5 Deviation from Test Standard

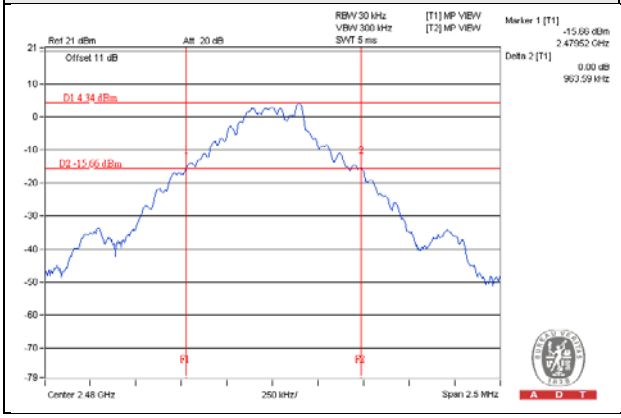
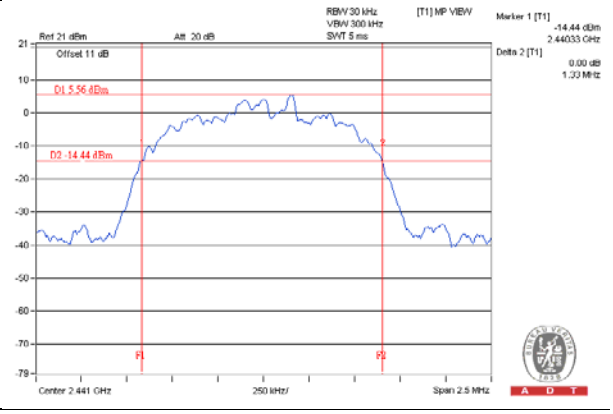
No deviation.

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	0.95	1.32
39	2441	0.95	1.33
78	2480	0.96	1.32

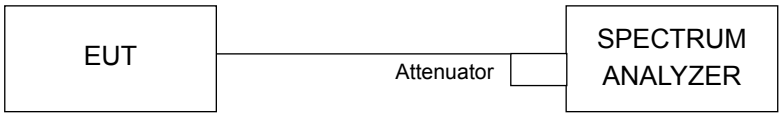
Spectrum Plot of Worst Value	
GFSK / CH 78	8DPSK / CH 39
	

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.

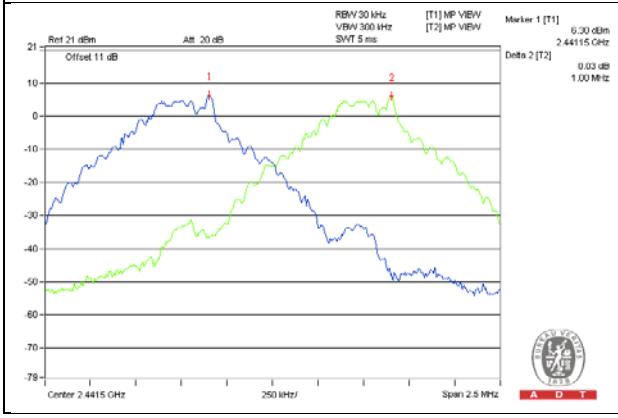
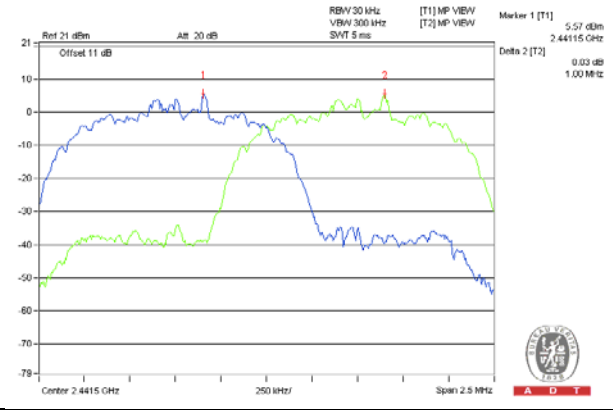
4.6.5 Deviation from Test Standard

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	0.95	1.32	0.64	0.88	Pass
39	2441	1.00	1.00	0.95	1.33	0.64	0.89	Pass
78	2480	1.01	1.00	0.96	1.32	0.64	0.88	Pass

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

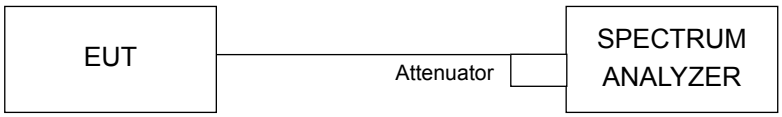
Spectrum Plot of Worst Value	
GFSK / CH39	**8DPSK / CH39**
	

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. 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. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3MHz RBW and 10 MHz VBW.

d. Measure the captured power within the band and recording the plot.

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

4.7.5 Deviation from Test Standard

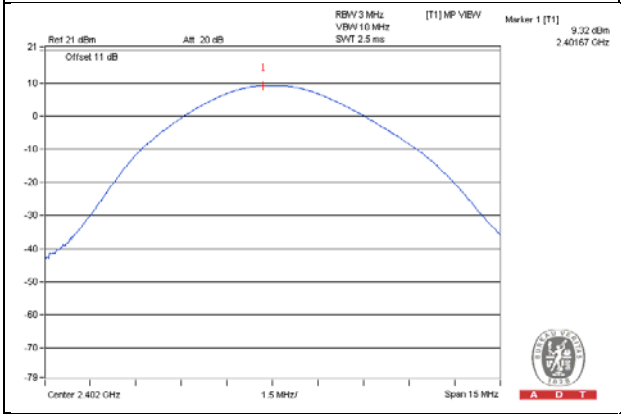
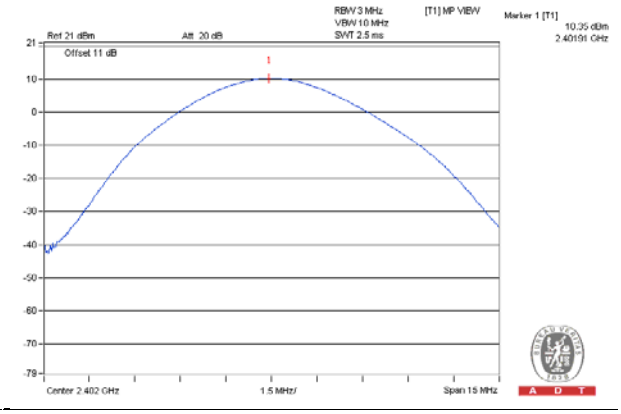
No deviation.

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	8.551	10.839	9.32	10.35	125	Pass
39	2441	6.339	9.016	8.02	9.55	125	Pass
78	2480	4.046	6.266	6.07	7.97	125	Pass

Spectrum Plot of Worst Value	
GFSK / CH0	8DPSK / CH0
	

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

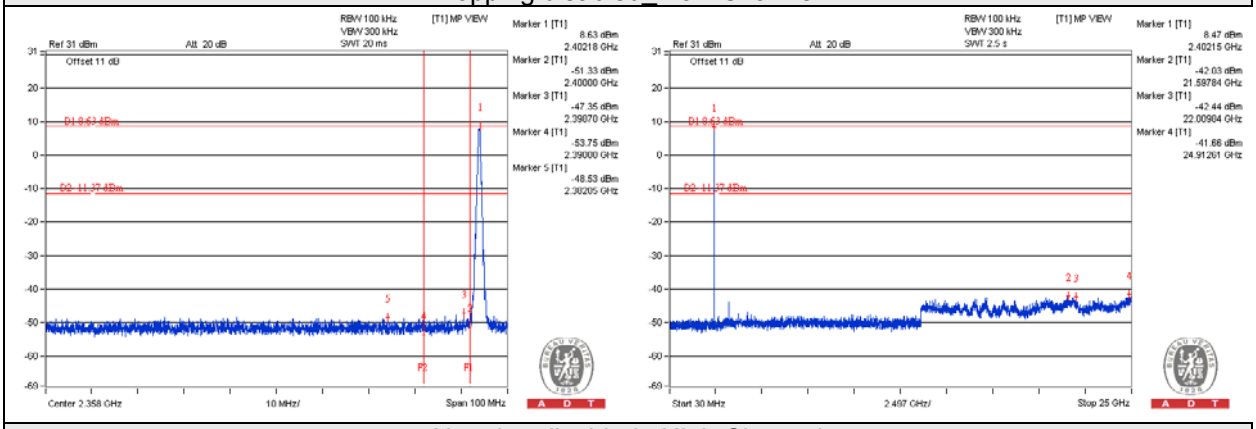
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.6 Test Results

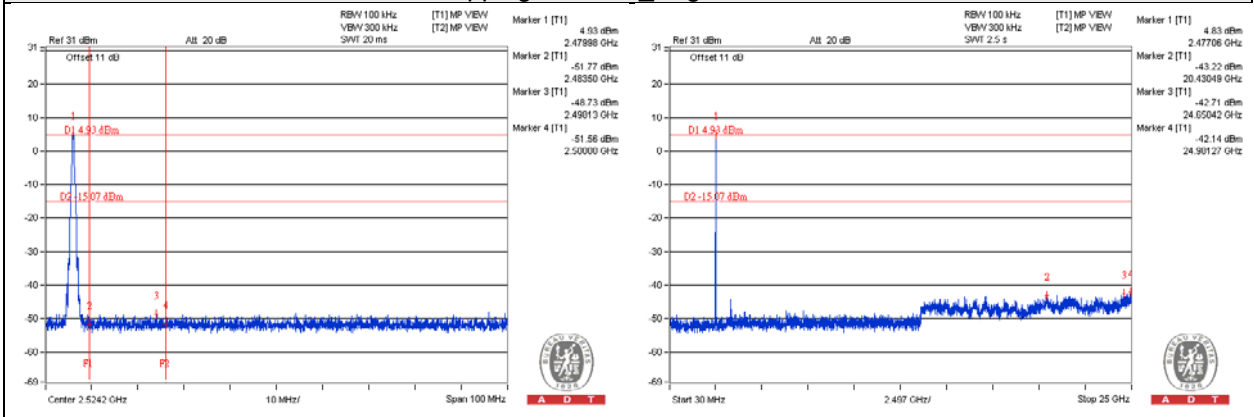
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

GFSK

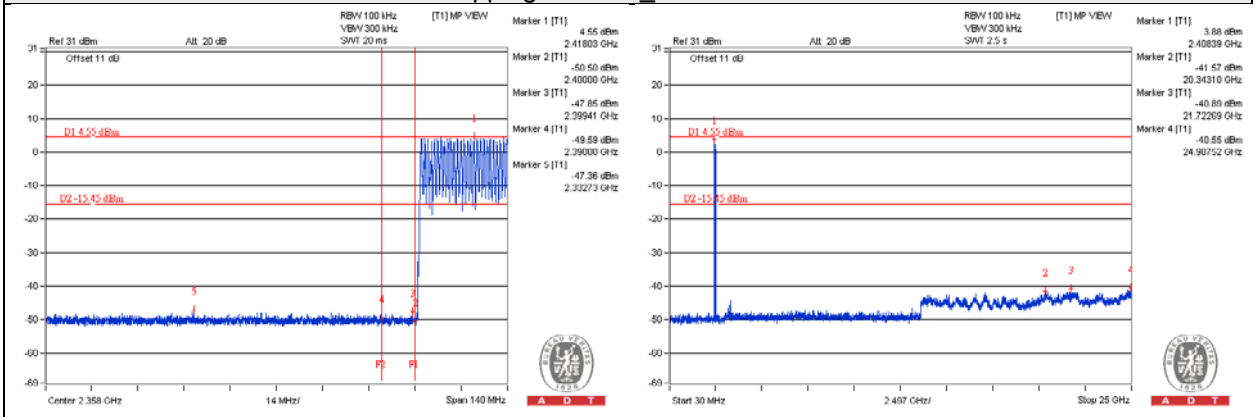
Hopping disabled_ Low Channel



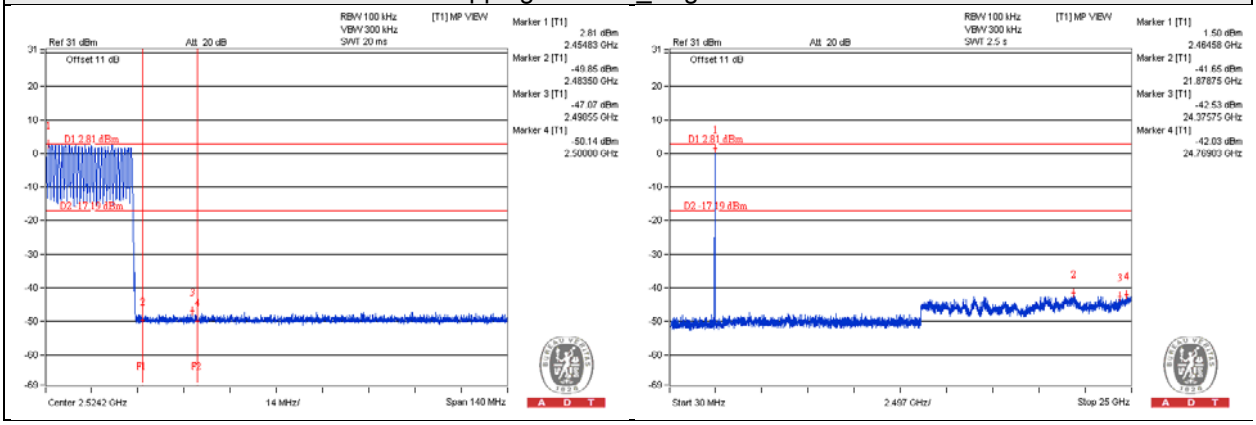
Hopping disabled_ High Channel



Hopping enabled_ Low Channel

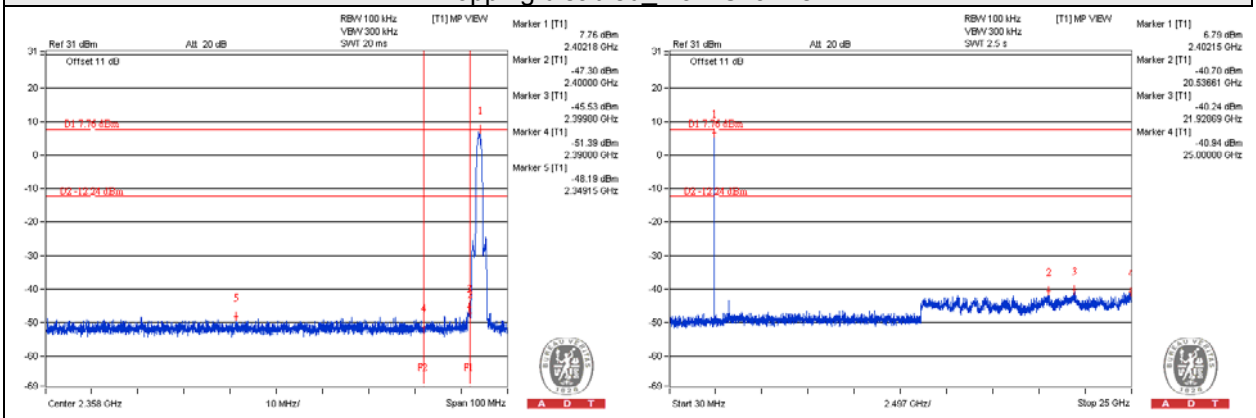


Hopping enabled_ High Channel

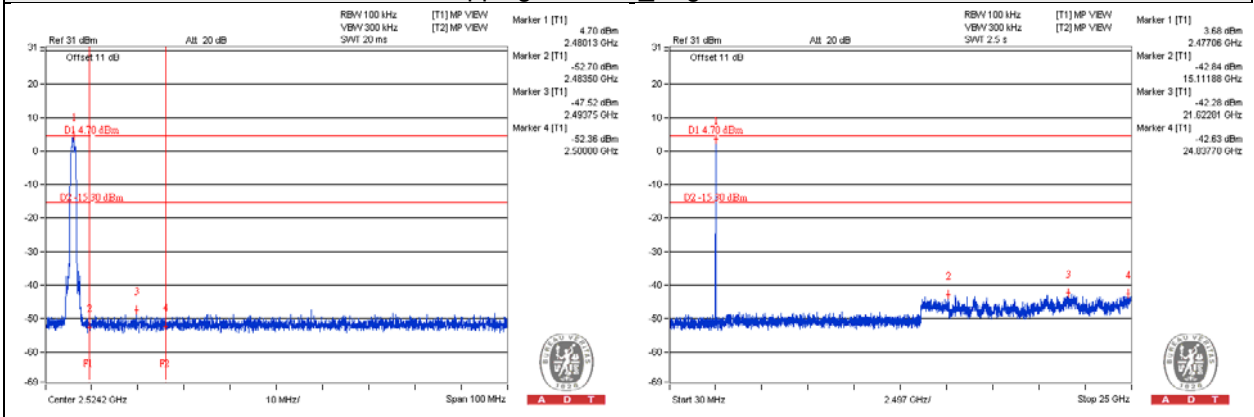


8DPSK

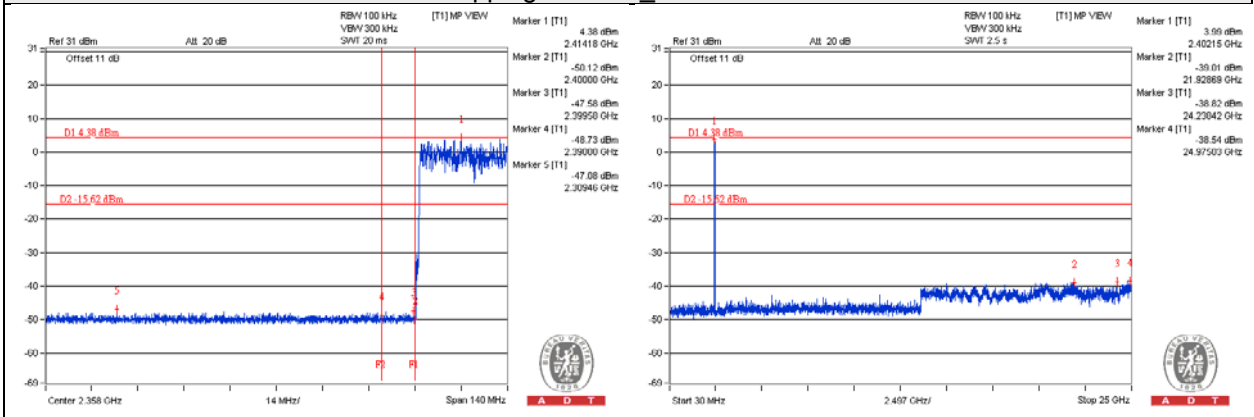
Hopping disabled_ Low Channel



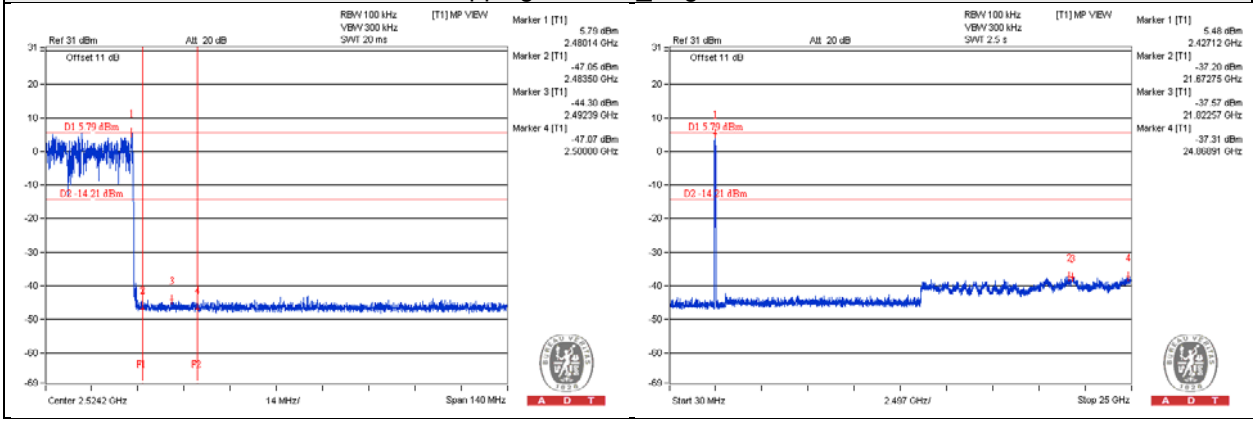
Hopping disabled_ High Channel



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.

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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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