

FCC Test Report (BT-EDR)

Report No.: RF190614E02-2 R1

FCC ID: B94SNPRC1950

Test Model: SNPRC-1950

Received Date: June 14, 2019

Test Date: Aug. 21 to 31, 2019

Issued Date: Sep. 23, 2019

Applicant: HP Inc.

Address: 3390 East Harmony Road, MS 66 Fort Collins, CO 80528

Manufacturer: HP Singapore (Private) Limited

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



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Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT (BT-EDR)	7
3.2 Description of Test Modes	9
3.2.1 Test Mode Applicability and Tested Channel Detail	10
3.3 Duty Cycle of Test Signal	12
3.4 Description of Support Units	13
3.4.1 Configuration of System under Test	13
3.5 General Description of Applied Standards	14
4 Test Types and Results	15
4.1 Radiated Emission and Bandedge Measurement	15
4.1.1 Limits of Radiated Emission and Bandedge Measurement	15
4.1.2 Test Instruments	16
4.1.3 Test Procedures	18
4.1.4 Deviation from Test Standard	19
4.1.5 Test Setup	19
4.1.6 EUT Operating Conditions	20
4.1.7 Test Results	21
4.2 Conducted Emission Measurement	45
4.2.1 Limits of Conducted Emission Measurement	45
4.2.2 Test Instruments	45
4.2.3 Test Procedures	46
4.2.4 Deviation from Test Standard	46
4.2.5 Test Setup	46
4.2.6 EUT Operating Condition	46
4.2.7 Test Results	47
4.3 Number of Hopping Frequency Used	49
4.3.1 Limits of Hopping Frequency Used Measurement	49
4.3.2 Test Setup	49
4.3.3 Test Instruments	49
4.3.4 Test Procedure	49
4.3.5 Deviation from Test Standard	49
4.3.6 Test Results	50
4.4 Dwell Time on Each Channel	51
4.4.1 Limits of Dwell Time on Each Channel Measurement	51
4.4.2 Test Setup	51
4.4.3 Test Instruments	51
4.4.4 Test Procedures	51
4.4.5 Deviation from Test Standard	51
4.4.6 Test Results	52
4.5 Channel Bandwidth	56
4.5.1 Limits of Channel Bandwidth Measurement	56
4.5.2 Test Setup	56
4.5.3 Test Instruments	56
4.5.4 Test Procedure	56
4.5.5 Deviation from Test Standard	56
4.5.6 EUT Operating Condition	56
4.5.7 Test Results	57
4.6 Hopping Channel Separation	58

4.6.1 Limits of Hopping Channel Separation Measurement.....	58
4.6.2 Test Setup.....	58
4.6.3 Test Instruments	58
4.6.4 Test Procedure	58
4.6.5 Deviation from Test Standard	58
4.6.6 Test Results	59
4.7 Maximum Output Power	60
4.7.1 Limits of Maximum Output Power Measurement	60
4.7.2 Test Setup.....	60
4.7.3 Test Instruments	60
4.7.4 Test Procedure	60
4.7.5 Deviation from Test Standard	60
4.7.6 EUT Operating Condition	60
4.7.7 Test Results	61
4.8 Conducted Out of Band Emission Measurement	62
4.8.1 Limits of Conducted Out of Band Emission Measurement	62
4.8.2 Test Instruments	62
4.8.3 Test Procedure	62
4.8.4 Deviation from Test Standard	62
4.8.5 EUT Operating Condition	62
4.8.6 Test Results	62
5 Pictures of Test Arrangements.....	65
Appendix – Information of the Testing Laboratories	66

Release Control Record

Issue No.	Description	Date Issued
RF190614E02-2	Original release.	Sep. 18, 2019
RF190614E02-2 R1	1. Modify the applicant and manufacturer information. 2. Modify the description of section 3.1.	Sep. 23, 2019

1 Certificate of Conformity

Product: 802.11a/b/g/n/ac (2.4 / 5 GHz) Wi-Fi radio + BT Radio Module

Brand:



Test Model: SNPRC-1950

Sample Status: ENGINEERING SAMPLE

Applicant: HP Inc.

Manufacturer: HP Singapore (Private) Limited

Test Date: Aug. 21 to 31, 2019

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

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

Prepared by : Wendy Wu , **Date:** Sep. 23, 2019
Wendy Wu / Specialist

Approved by : May Chen , **Date:** Sep. 23, 2019
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 -17.72dB at 0.36094MHz.
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 -6.0dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Internal antenna no antenna connector is used. External antenna connector is i-pex(MHF) not a standard connector.

NOTE:

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	4.8 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.0 dB
	6GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 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 (2.4 / 5 GHz) Wi-Fi radio + BT Radio Module
Brand	
Test Model	SNPRC-1950
Status of EUT	ENGINEERING SAMPLE
Manufacturer	HP Singapore (Private) Limited
Power Supply Rating	DC 3.3V from host equipment
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	Up to 3Mbps
Operating Frequency Band	2400MHz ~ 2483.5MHz
Number of Channel	79
Output Power	7.907mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. 2.4GHz & 5GHz technology can't transmit at same time.
2. Simultaneously transmission condition.

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.

3. The EUT has the below configurations:

Part Numbers	Description
0960-4628	straight connector
0960-4622	straight connector
0960-4630	FFC connector

Note: From the above conditions, the worst case radiated emissions was found to be with FFC connector config, therefore only the test data of this config was recorded in this report.

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

Internal Antenna						
Antenna No.	Brand	Model	Ant. Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type
1	HP Inc.	SNPRC-1950	3.5	2.4-2.5	PCB	None
			4.5	5-6		
External Antenna						
2	Yageo	ANTX300P002B24553	0.9	2.4-2.5	PCB	i-pex(MHF)
			2.3	5.150-5.875		
3	Pulse	SZ0595D	2.5	2.4-2.5	PIFA	i-pex(MHF)
			3	4.9-5.9		
4	Yageo	ANTX200P002B24553	0.9	2.4-2.5	PCB	i-pex(MHF)
			2.3	5.150-5.875		
5	Pulse	SZ07751	2.5	2.4-2.5	PIFA	i-pex(MHF)
			3	4.9-5.9		

Note:

1. The external antenna will fix transmission on Chain 1
2. The Bluetooth technology will fix transmission on Chain 1
3. For radiated emissions test from the above antennas, the Ant. No.: 1, 2, 5 were selected as representative model for the test and its data was recorded in this report.

5. The above EUT information is declared by manufacturer and for more detailed features description, please refers 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	
-	√	√	√	√	-

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 internal Ant. No.: 1 (Chain 1) PCB antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane (Below 1GHz) & Y-plane (Above 1GHz)**.
2. The EUT's external Ant. No.: 2 (Chain 1) PCB antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane (Below 1GHz) & Y-plane (Above 1GHz)**.
3. The EUT's external Ant. No.: 5 (Chain 1) PIFA antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane (Below 1GHz) & Y-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, configurations (Header pin and FFC), antenna types (integrated and external antennas of different vendor and different length), 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, configurations (Header pin and FFC), antenna types (integrated and external antennas of different vendor and different length), 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, configurations (Header pin and FFC), antenna types (integrated and external antennas of different vendor and different length), 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, configurations (Header pin and FFC), antenna types (integrated and external antennas of different vendor and different length), 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

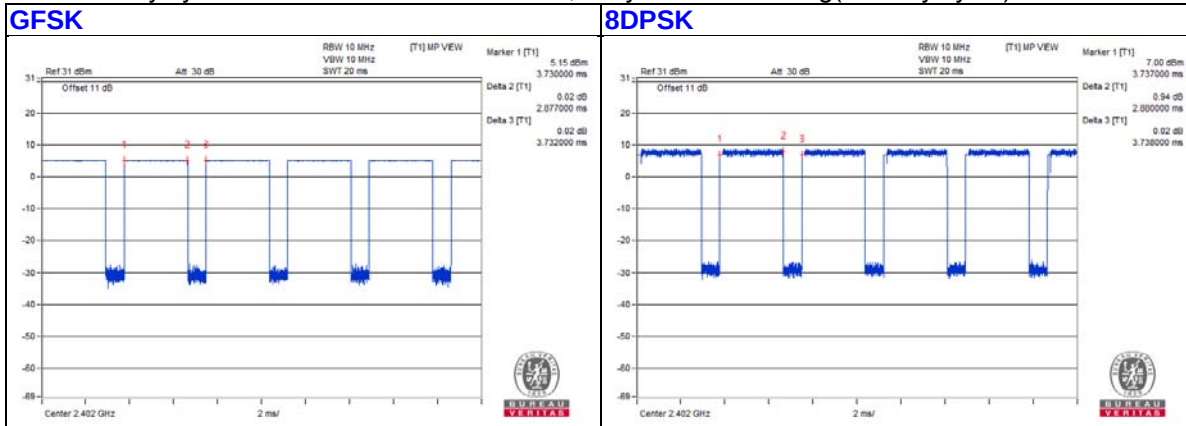
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (System)	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
PLC	23deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

GFSK: Duty cycle = 2.877 ms / 3.732 ms = 0.771, Duty factor = $10 \cdot \log(1 / \text{Duty cycle}) = 1.13$

8DPSK: Duty cycle = 2.88 ms / 3.738 ms = 0.77, Duty factor = $10 \cdot \log(1 / \text{Duty cycle}) = 1.13$



3.4 Description of Support Units

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

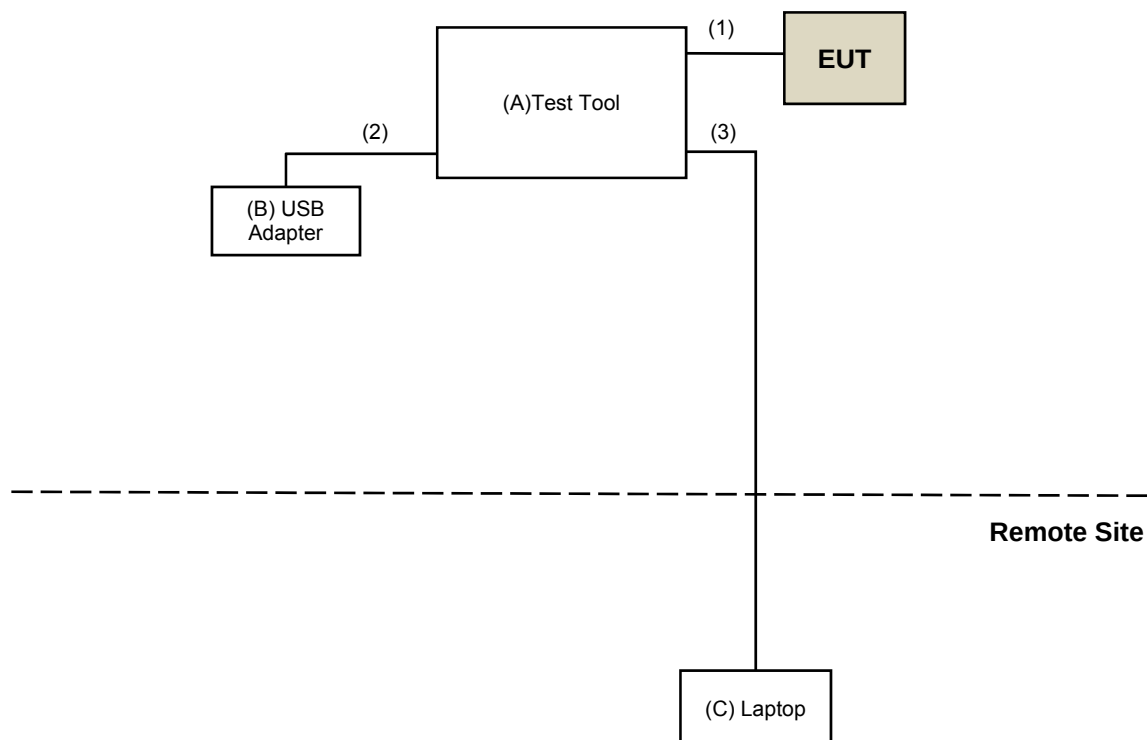
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Test Tool	Realtek	Test Tool	NA	NA	Supplied by client
B.	USB Adapter	ASUS	EXA1205UA	NA	NA	Provided by Lab
C.	Laptop	Dell	Inspiron 15-3567	FV34LJ2	NA	Provided by Lab

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.	Data Cable	1	0.05	No	0	Supplied by client
2.	Micro USB Cable	1	1	Yes	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 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 v05r02

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

For Radiated Emission Test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ESR7 R&S	ESR7	102026	Apr. 24, 2019	Apr. 23, 2020
Spectrum Analyzer Keysight	N9030B	MY57141948	May 25, 2019	May 24, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier EMCI	EMC330N	980538	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB9168	9168-0842	Nov. 21, 2018	Nov. 20, 2019
RF Cable	8D	966-5-1	May 03, 2019	May 02, 2020
RF Cable	8D	966-5-2	May 03, 2019	May 02, 2020
RF Cable	8D	966-5-3	May 03, 2019	May 02, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-1819	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980509	May 03, 2019	May 02, 2020
RF Cable EMCI	EMC104-SM-SM-1500	180503	May 03, 2019	May 02, 2020
RF Cable EMCI	EMC104-SM-SM-2000	180501	May 03, 2019	May 02, 2020
RF Cable EMCI	EMC104-SM-SM-6000	180505	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

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. 5.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Aug. 28, 2019

For Other Test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Aug. 31, 2019

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

For Radiated emission above 30MHz

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

Note:

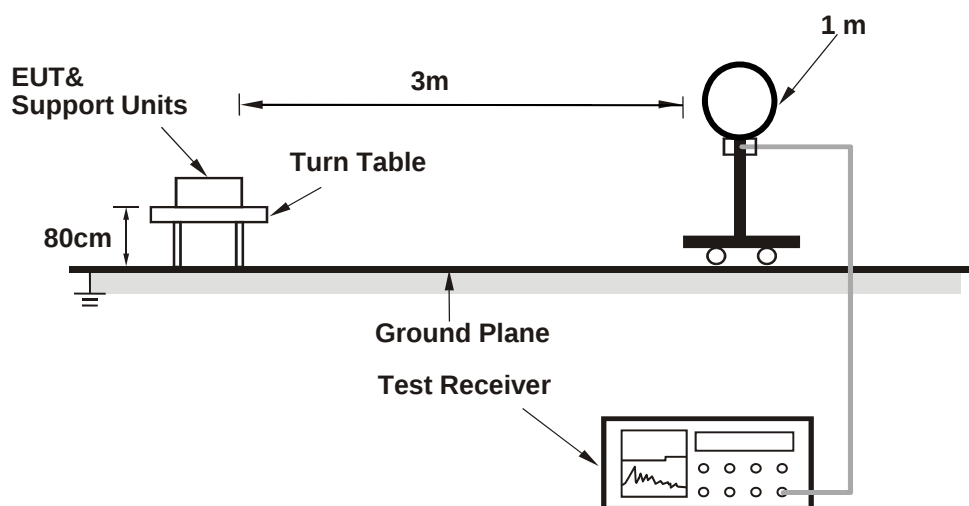
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

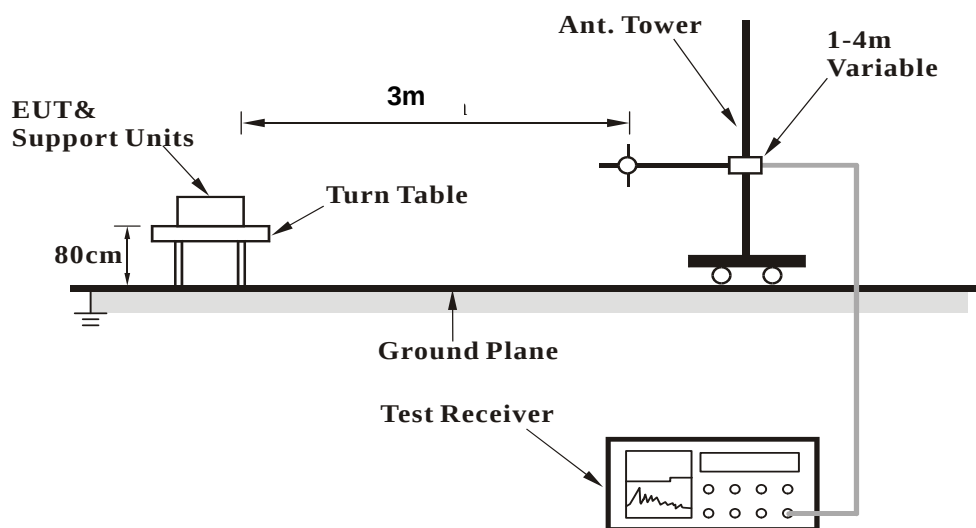
No deviation.

4.1.5 Test Setup

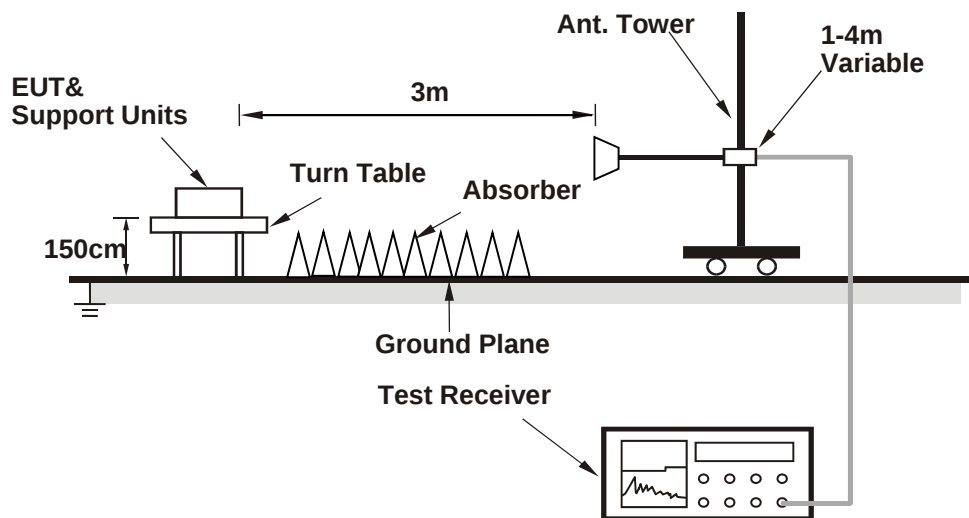
For Radiated emission below 30MHz



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

- Placed the EUT on the testing table.
- Controlling software (Raspberry PI v1.02 paste RF) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

For internal Ant. No.: 1 PCB antenna (Model: SNPRC-1950)

Above 1GHz Data:

BT_GFSK

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.5 PK	74.0	-15.5	1.80 H	209	61.6	-3.1
2	2390.00	47.5 AV	54.0	-6.5	1.80 H	209	50.6	-3.1
3	*2402.00	100.7 PK			1.80 H	209	103.8	-3.1
4	*2402.00	100.0 AV			1.80 H	209	103.1	-3.1
5	4804.00	43.1 PK	74.0	-30.9	2.77 H	332	41.9	1.2
6	4804.00	35.0 AV	54.0	-19.0	2.77 H	332	33.8	1.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.7 PK	74.0	-17.3	1.45 V	220	59.8	-3.1
2	2390.00	44.2 AV	54.0	-9.8	1.45 V	220	47.3	-3.1
3	*2402.00	96.6 PK			1.45 V	220	99.7	-3.1
4	*2402.00	95.9 AV			1.45 V	220	99.0	-3.1
5	4804.00	41.8 PK	74.0	-32.2	1.64 V	38	40.6	1.2
6	4804.00	32.9 AV	54.0	-21.1	1.64 V	38	31.7	1.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 39	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	*2441.00	100.6 PK			1.86 H	209	103.8	-3.2
2	*2441.00	99.4 AV			1.86 H	209	102.6	-3.2
3	4882.00	43.0 PK	74.0	-31.0	2.73 H	350	41.8	1.2
4	4882.00	34.7 AV	54.0	-19.3	2.73 H	350	33.5	1.2
5	7323.00	48.9 PK	74.0	-25.1	1.61 H	194	41.7	7.2
6	7323.00	39.4 AV	54.0	-14.6	1.61 H	194	32.2	7.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	96.2 PK			1.56 V	206	99.4	-3.2
2	*2441.00	96.2 AV			1.56 V	206	99.4	-3.2
3	4882.00	43.3 PK	74.0	-30.7	1.59 V	27	42.1	1.2
4	4882.00	33.8 AV	54.0	-20.2	1.59 V	27	32.6	1.2
5	7323.00	47.4 PK	74.0	-26.6	1.58 V	98	40.2	7.2
6	7323.00	37.1 AV	54.0	-16.9	1.58 V	98	29.9	7.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

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	101.0 PK			1.82 H	215	104.1	-3.1
2	*2480.00	100.2 AV			1.82 H	215	103.3	-3.1
3	2483.50	59.1 PK	74.0	-14.9	1.82 H	215	62.2	-3.1
4	2483.50	48.0 AV	54.0	-6.0	1.82 H	215	51.1	-3.1
5	4960.00	42.9 PK	74.0	-31.1	2.74 H	329	41.5	1.4
6	4960.00	34.7 AV	54.0	-19.3	2.74 H	329	33.3	1.4
7	7440.00	48.0 PK	74.0	-26.0	1.57 H	212	40.7	7.3
8	7440.00	38.5 AV	54.0	-15.5	1.57 H	212	31.2	7.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	96.5 PK			1.59 V	198	99.6	-3.1
2	*2480.00	95.8 AV			1.59 V	198	98.9	-3.1
3	2483.50	56.6 PK	74.0	-17.4	1.59 V	198	59.7	-3.1
4	2483.50	44.0 AV	54.0	-10.0	1.59 V	198	47.1	-3.1
5	4960.00	43.2 PK	74.0	-30.8	1.71 V	34	41.8	1.4
6	4960.00	34.2 AV	54.0	-19.8	1.71 V	34	32.8	1.4
7	7440.00	48.1 PK	74.0	-25.9	1.55 V	109	40.8	7.3
8	7440.00	37.8 AV	54.0	-16.2	1.55 V	109	30.5	7.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

BT_8DPSK

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.3 PK	74.0	-14.7	1.77 H	216	62.4	-3.1
2	2390.00	47.8 AV	54.0	-6.2	1.77 H	216	50.9	-3.1
3	*2402.00	100.9 PK			1.77 H	216	104.0	-3.1
4	*2402.00	95.4 AV			1.77 H	216	98.5	-3.1
5	4804.00	42.2 PK	74.0	-31.8	2.76 H	327	41.0	1.2
6	4804.00	34.4 AV	54.0	-19.6	2.76 H	327	33.2	1.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.5 PK	74.0	-17.5	1.53 V	176	59.6	-3.1
2	2390.00	43.6 AV	54.0	-10.4	1.53 V	176	46.7	-3.1
3	*2402.00	95.5 PK			1.53 V	176	98.6	-3.1
4	*2402.00	91.9 AV			1.53 V	176	95.0	-3.1
5	4804.00	44.0 PK	74.0	-30.0	1.69 V	33	42.8	1.2
6	4804.00	34.8 AV	54.0	-19.2	1.69 V	33	33.6	1.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 39	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	*2441.00	101.0 PK			1.82 H	222	104.2	-3.2
2	*2441.00	95.2 AV			1.82 H	222	98.4	-3.2
3	4882.00	43.0 PK	74.0	-31.0	2.68 H	344	41.8	1.2
4	4882.00	34.9 AV	54.0	-19.1	2.68 H	344	33.7	1.2
5	7323.00	48.0 PK	74.0	-26.0	1.53 H	208	40.8	7.2
6	7323.00	38.8 AV	54.0	-15.2	1.53 H	208	31.6	7.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	95.4 PK			1.66 V	201	98.6	-3.2
2	*2441.00	91.5 AV			1.66 V	201	94.7	-3.2
3	4882.00	44.0 PK	74.0	-30.0	1.68 V	50	42.8	1.2
4	4882.00	35.0 AV	54.0	-19.0	1.68 V	50	33.8	1.2
5	7323.00	48.9 PK	74.0	-25.1	1.58 V	119	41.7	7.2
6	7323.00	38.1 AV	54.0	-15.9	1.58 V	119	30.9	7.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

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	100.6 PK			1.79 H	222	103.7	-3.1
2	*2480.00	94.7 AV			1.79 H	222	97.8	-3.1
3	2483.50	59.3 PK	74.0	-14.7	1.79 H	222	62.4	-3.1
4	2483.50	47.6 AV	54.0	-6.4	1.79 H	222	50.7	-3.1
5	4960.00	42.8 PK	74.0	-31.2	2.69 H	342	41.4	1.4
6	4960.00	35.0 AV	54.0	-19.0	2.69 H	342	33.6	1.4
7	7440.00	48.7 PK	74.0	-25.3	1.53 H	223	41.4	7.3
8	7440.00	39.5 AV	54.0	-14.5	1.53 H	223	32.2	7.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	95.4 PK			1.54 V	163	98.5	-3.1
2	*2480.00	91.5 AV			1.54 V	163	94.6	-3.1
3	2483.50	57.6 PK	74.0	-16.4	1.54 V	163	60.7	-3.1
4	2483.50	44.6 AV	54.0	-9.4	1.54 V	163	47.7	-3.1
5	4960.00	43.4 PK	74.0	-30.6	1.69 V	48	42.0	1.4
6	4960.00	34.3 AV	54.0	-19.7	1.69 V	48	32.9	1.4
7	7440.00	48.5 PK	74.0	-25.5	1.56 V	91	41.2	7.3
8	7440.00	37.8 AV	54.0	-16.2	1.56 V	91	30.5	7.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

Below 1GHz Data:

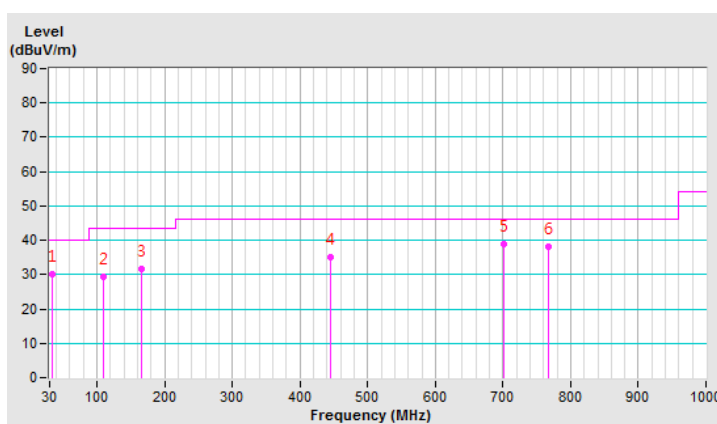
BT_GFSK

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	33.56	30.0 QP	40.0	-10.0	2.00 H	301	49.2	-19.2
2	109.46	29.2 QP	43.5	-14.3	4.00 H	314	50.1	-20.9
3	165.91	31.5 QP	43.5	-12.0	2.50 H	64	49.7	-18.2
4	446.09	34.9 QP	46.0	-11.1	2.50 H	14	48.4	-13.5
5	700.30	38.8 QP	46.0	-7.2	1.00 H	273	47.8	-9.0
6	766.76	38.2 QP	46.0	-7.8	2.00 H	100	46.0	-7.8

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 other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

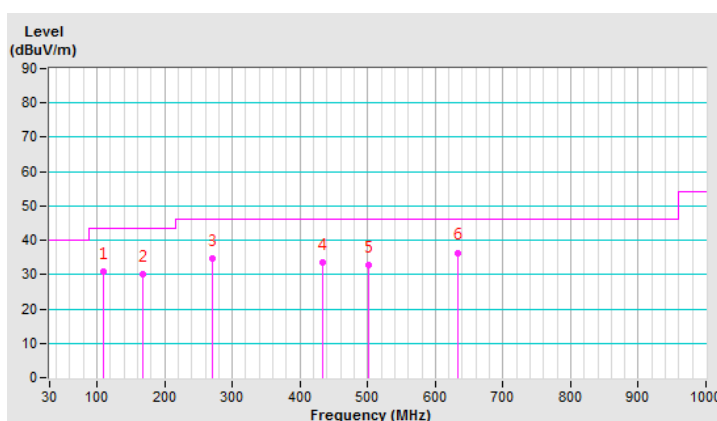


CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	109.80	31.0 QP	43.5	-12.5	1.00 V	272	51.9	-20.9
2	166.89	30.2 QP	43.5	-13.3	1.25 V	134	48.5	-18.3
3	270.69	34.8 QP	46.0	-11.2	2.00 V	360	53.0	-18.2
4	433.83	33.5 QP	46.0	-12.5	1.00 V	276	47.5	-14.0
5	500.80	32.9 QP	46.0	-13.1	2.00 V	12	45.7	-12.8
6	633.46	36.4 QP	46.0	-9.6	1.00 V	343	46.4	-10.0

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



For external Ant. No.: 2 PCB antenna (Model: ANT300P002B24553)

ABOVE 1GHz DATA

BT_GFSK

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.1 PK	74.0	-14.9	1.75 H	209	62.2	-3.1
2	2390.00	47.8 AV	54.0	-6.2	1.75 H	209	50.9	-3.1
3	*2402.00	100.6 PK			1.75 H	209	103.7	-3.1
4	*2402.00	99.9 AV			1.75 H	209	103.0	-3.1
5	4804.00	43.1 PK	74.0	-30.9	2.75 H	322	41.9	1.2
6	4804.00	34.7 AV	54.0	-19.3	2.75 H	322	33.5	1.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.5 PK	74.0	-16.5	1.51 V	204	60.6	-3.1
2	2390.00	44.7 AV	54.0	-9.3	1.51 V	204	47.8	-3.1
3	*2402.00	95.8 PK			1.51 V	204	98.9	-3.1
4	*2402.00	94.9 AV			1.51 V	204	98.0	-3.1
5	4804.00	41.9 PK	74.0	-32.1	1.57 V	33	40.7	1.2
6	4804.00	33.1 AV	54.0	-20.9	1.57 V	33	31.9	1.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 39	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	*2441.00	100.3 PK			1.77 H	218	103.5	-3.2
2	*2441.00	99.9 AV			1.77 H	218	103.1	-3.2
3	4882.00	42.6 PK	74.0	-31.4	2.74 H	344	41.4	1.2
4	4882.00	34.5 AV	54.0	-19.5	2.74 H	344	33.3	1.2
5	7323.00	48.5 PK	74.0	-25.5	1.56 H	179	41.3	7.2
6	7323.00	38.9 AV	54.0	-15.1	1.56 H	179	31.7	7.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	95.8 PK			1.61 V	185	99.0	-3.2
2	*2441.00	94.9 AV			1.61 V	185	98.1	-3.2
3	4882.00	42.3 PK	74.0	-31.7	1.63 V	40	41.1	1.2
4	4882.00	33.4 AV	54.0	-20.6	1.63 V	40	32.2	1.2
5	7323.00	47.8 PK	74.0	-26.2	1.51 V	91	40.6	7.2
6	7323.00	37.1 AV	54.0	-16.9	1.51 V	91	29.9	7.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

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	101.0 PK			1.72 H	206	104.1	-3.1
2	*2480.00	100.4 AV			1.72 H	206	103.5	-3.1
3	2483.50	58.9 PK	74.0	-15.1	1.72 H	206	62.0	-3.1
4	2483.50	47.9 AV	54.0	-6.1	1.72 H	206	51.0	-3.1
5	4960.00	43.0 PK	74.0	-31.0	2.76 H	344	41.6	1.4
6	4960.00	34.6 AV	54.0	-19.4	2.76 H	344	33.2	1.4
7	7440.00	48.6 PK	74.0	-25.4	1.63 H	183	41.3	7.3
8	7440.00	39.0 AV	54.0	-15.0	1.63 H	183	31.7	7.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	95.4 PK			1.63 V	175	98.5	-3.1
2	*2480.00	94.6 AV			1.63 V	175	97.7	-3.1
3	2483.50	56.5 PK	74.0	-17.5	1.63 V	175	59.6	-3.1
4	2483.50	43.4 AV	54.0	-10.6	1.63 V	175	46.5	-3.1
5	4960.00	42.6 PK	74.0	-31.4	1.66 V	47	41.2	1.4
6	4960.00	33.7 AV	54.0	-20.3	1.66 V	47	32.3	1.4
7	7440.00	47.7 PK	74.0	-26.3	1.56 V	94	40.4	7.3
8	7440.00	37.1 AV	54.0	-16.9	1.56 V	94	29.8	7.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

BT_8DPSK

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.9 PK	74.0	-15.1	1.75 H	212	62.0	-3.1
2	2390.00	47.4 AV	54.0	-6.6	1.75 H	212	50.5	-3.1
3	*2402.00	100.0 PK			1.75 H	212	103.1	-3.1
4	*2402.00	94.4 AV			1.75 H	212	97.5	-3.1
5	4804.00	42.8 PK	74.0	-31.2	2.74 H	345	41.6	1.2
6	4804.00	35.1 AV	54.0	-18.9	2.74 H	345	33.9	1.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.4 PK	74.0	-17.6	1.56 V	174	59.5	-3.1
2	2390.00	43.8 AV	54.0	-10.2	1.56 V	174	46.9	-3.1
3	*2402.00	95.8 PK			1.56 V	174	98.9	-3.1
4	*2402.00	92.0 AV			1.56 V	174	95.1	-3.1
5	4804.00	44.1 PK	74.0	-29.9	1.68 V	46	42.9	1.2
6	4804.00	35.1 AV	54.0	-18.9	1.68 V	46	33.9	1.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 39	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	*2441.00	100.1 PK			1.81 H	228	103.3	-3.2
2	*2441.00	94.4 AV			1.81 H	228	97.6	-3.2
3	4882.00	42.3 PK	74.0	-31.7	2.73 H	347	41.1	1.2
4	4882.00	34.7 AV	54.0	-19.3	2.73 H	347	33.5	1.2
5	7323.00	48.7 PK	74.0	-25.3	1.50 H	226	41.5	7.2
6	7323.00	39.5 AV	54.0	-14.5	1.50 H	226	32.3	7.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	95.4 PK			1.62 V	196	98.6	-3.2
2	*2441.00	91.7 AV			1.62 V	196	94.9	-3.2
3	4882.00	43.8 PK	74.0	-30.2	1.67 V	51	42.6	1.2
4	4882.00	34.9 AV	54.0	-19.1	1.67 V	51	33.7	1.2
5	7323.00	48.7 PK	74.0	-25.3	1.57 V	105	41.5	7.2
6	7323.00	38.1 AV	54.0	-15.9	1.57 V	105	30.9	7.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

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	100.8 PK			1.82 H	211	103.9	-3.1
2	*2480.00	94.7 AV			1.82 H	211	97.8	-3.1
3	2483.50	59.1 PK	74.0	-14.9	1.82 H	211	62.2	-3.1
4	2483.50	47.3 AV	54.0	-6.7	1.82 H	211	50.4	-3.1
5	4960.00	42.1 PK	74.0	-31.9	2.64 H	355	40.7	1.4
6	4960.00	34.6 AV	54.0	-19.4	2.64 H	355	33.2	1.4
7	7440.00	49.2 PK	74.0	-24.8	1.57 H	214	41.9	7.3
8	7440.00	39.7 AV	54.0	-14.3	1.57 H	214	32.4	7.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	95.5 PK			1.55 V	177	98.6	-3.1
2	*2480.00	91.5 AV			1.55 V	177	94.6	-3.1
3	2483.50	56.9 PK	74.0	-17.1	1.55 V	177	60.0	-3.1
4	2483.50	44.1 AV	54.0	-9.9	1.55 V	177	47.2	-3.1
5	4960.00	43.4 PK	74.0	-30.6	1.71 V	41	42.0	1.4
6	4960.00	34.0 AV	54.0	-20.0	1.71 V	41	32.6	1.4
7	7440.00	48.8 PK	74.0	-25.2	1.60 V	105	41.5	7.3
8	7440.00	38.3 AV	54.0	-15.7	1.60 V	105	31.0	7.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

Below 1GHz Data:

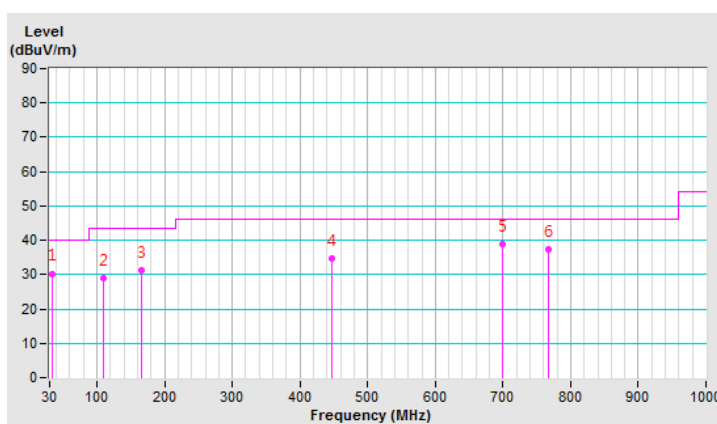
BT_GFSK

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	33.33	30.3 QP	40.0	-9.7	2.00 H	317	49.6	-19.3
2	109.95	28.9 QP	43.5	-14.6	4.00 H	311	49.8	-20.9
3	165.88	31.4 QP	43.5	-12.1	2.00 H	79	49.6	-18.2
4	446.30	34.6 QP	46.0	-11.4	2.00 H	10	48.1	-13.5
5	700.14	38.9 QP	46.0	-7.1	1.00 H	288	47.9	-9.0
6	766.86	37.5 QP	46.0	-8.5	2.00 H	86	45.3	-7.8

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 other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

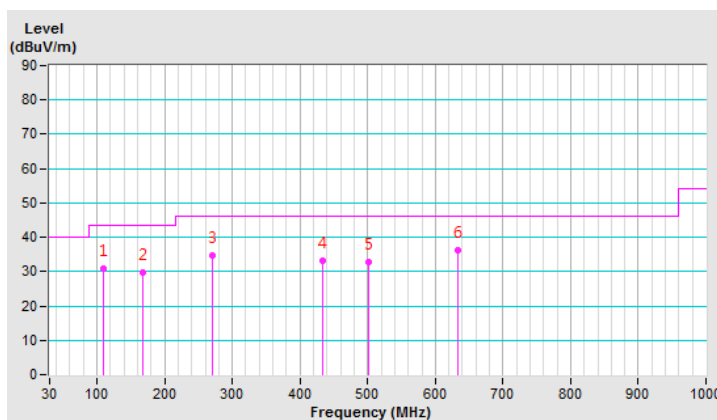


CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	109.77	31.0 QP	43.5	-12.5	1.00 V	281	51.9	-20.9
2	167.10	29.7 QP	43.5	-13.8	1.50 V	131	48.0	-18.3
3	271.06	34.8 QP	46.0	-11.2	1.50 V	264	53.0	-18.2
4	433.55	33.2 QP	46.0	-12.8	1.00 V	276	47.2	-14.0
5	501.25	32.8 QP	46.0	-13.2	2.00 V	21	45.6	-12.8
6	633.88	36.2 QP	46.0	-9.8	1.00 V	345	46.2	-10.0

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



For external Ant. No.: 5 PIFA antenna (Model: SZ07751)

ABOVE 1GHz DATA

BT_GFSK

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.7 PK	74.0	-17.3	1.64 H	167	59.8	-3.1
2	2390.00	43.7 AV	54.0	-10.3	1.64 H	167	46.8	-3.1
3	*2402.00	95.0 PK			1.64 H	167	98.1	-3.1
4	*2402.00	94.2 AV			1.64 H	167	97.3	-3.1
5	4804.00	42.9 PK	74.0	-31.1	1.61 H	57	41.7	1.2
6	4804.00	34.2 AV	54.0	-19.8	1.61 H	57	33.0	1.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.9 PK	74.0	-15.1	1.90 V	212	62.0	-3.1
2	2390.00	47.5 AV	54.0	-6.5	1.90 V	212	50.6	-3.1
3	*2402.00	100.8 PK			1.90 V	212	103.9	-3.1
4	*2402.00	99.9 AV			1.90 V	212	103.0	-3.1
5	4804.00	42.7 PK	74.0	-31.3	2.62 V	302	41.5	1.2
6	4804.00	34.2 AV	54.0	-19.8	2.62 V	302	33.0	1.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 39	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	*2441.00	95.3 PK			1.68 H	161	98.5	-3.2
2	*2441.00	94.2 AV			1.68 H	161	97.4	-3.2
3	4882.00	42.7 PK	74.0	-31.3	1.71 H	36	41.5	1.2
4	4882.00	33.9 AV	54.0	-20.1	1.71 H	36	32.7	1.2
5	7323.00	47.9 PK	74.0	-26.1	1.54 H	108	40.7	7.2
6	7323.00	37.6 AV	54.0	-16.4	1.54 H	108	30.4	7.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	100.3 PK			1.85 V	225	103.5	-3.2
2	*2441.00	99.5 AV			1.85 V	225	102.7	-3.2
3	4882.00	42.9 PK	74.0	-31.1	2.68 V	302	41.7	1.2
4	4882.00	34.2 AV	54.0	-19.8	2.68 V	302	33.0	1.2
5	7323.00	47.1 PK	74.0	-26.9	1.57 V	210	39.9	7.2
6	7323.00	38.8 AV	54.0	-15.2	1.57 V	210	31.6	7.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

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	95.0 PK			1.61 H	184	98.1	-3.1
2	*2480.00	94.4 AV			1.61 H	184	97.5	-3.1
3	2483.50	56.2 PK	74.0	-17.8	1.61 H	184	59.3	-3.1
4	2483.50	43.2 AV	54.0	-10.8	1.61 H	184	46.3	-3.1
5	4960.00	43.1 PK	74.0	-30.9	1.68 H	59	41.7	1.4
6	4960.00	34.2 AV	54.0	-19.8	1.68 H	59	32.8	1.4
7	7440.00	47.8 PK	74.0	-26.2	1.60 H	91	40.5	7.3
8	7440.00	37.5 AV	54.0	-16.5	1.60 H	91	30.2	7.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	100.4 PK			1.92 V	227	103.5	-3.1
2	*2480.00	99.9 AV			1.92 V	227	103.0	-3.1
3	2483.50	58.4 PK	74.0	-15.6	1.92 V	227	61.5	-3.1
4	2483.50	46.9 AV	54.0	-7.1	1.92 V	227	50.0	-3.1
5	4960.00	43.3 PK	74.0	-30.7	2.59 V	282	41.9	1.4
6	4960.00	34.6 AV	54.0	-19.4	2.59 V	282	33.2	1.4
7	7440.00	47.1 PK	74.0	-26.9	1.53 V	206	39.8	7.3
8	7440.00	38.9 AV	54.0	-15.1	1.53 V	206	31.6	7.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

BT_8DPSK

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.3 PK	74.0	-16.7	1.56 H	171	60.4	-3.1
2	2390.00	44.4 AV	54.0	-9.6	1.56 H	171	47.5	-3.1
3	*2402.00	95.3 PK			1.56 H	171	98.4	-3.1
4	*2402.00	91.4 AV			1.56 H	171	94.5	-3.1
5	4804.00	43.1 PK	74.0	-30.9	1.70 H	33	41.9	1.2
6	4804.00	33.7 AV	54.0	-20.3	1.70 H	33	32.5	1.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.4 PK	74.0	-14.6	1.81 V	226	62.5	-3.1
2	2390.00	47.7 AV	54.0	-6.3	1.81 V	226	50.8	-3.1
3	*2402.00	100.2 PK			1.81 V	226	103.3	-3.1
4	*2402.00	94.4 AV			1.81 V	226	97.5	-3.1
5	4804.00	42.3 PK	74.0	-31.7	2.65 V	358	41.1	1.2
6	4804.00	35.0 AV	54.0	-19.0	2.65 V	358	33.8	1.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 39	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	*2441.00	95.8 PK			1.50 H	176	99.0	-3.2
2	*2441.00	92.0 AV			1.50 H	176	95.2	-3.2
3	4882.00	43.9 PK	74.0	-30.1	1.69 H	31	42.7	1.2
4	4882.00	34.2 AV	54.0	-19.8	1.69 H	31	33.0	1.2
5	7323.00	49.5 PK	74.0	-24.5	1.57 H	118	42.3	7.2
6	7323.00	38.8 AV	54.0	-15.2	1.57 H	118	31.6	7.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	101.0 PK			1.80 V	218	104.2	-3.2
2	*2441.00	95.1 AV			1.80 V	218	98.3	-3.2
3	4882.00	42.5 PK	74.0	-31.5	2.69 V	350	41.3	1.2
4	4882.00	34.8 AV	54.0	-19.2	2.69 V	350	33.6	1.2
5	7323.00	49.8 PK	74.0	-24.2	1.57 V	228	42.6	7.2
6	7323.00	40.1 AV	54.0	-13.9	1.57 V	228	32.9	7.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

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	95.3 PK			1.52 H	178	98.4	-3.1
2	*2480.00	91.2 AV			1.52 H	178	94.3	-3.1
3	2483.50	57.6 PK	74.0	-16.4	1.52 H	178	60.7	-3.1
4	2483.50	44.6 AV	54.0	-9.4	1.52 H	178	47.7	-3.1
5	4960.00	43.2 PK	74.0	-30.8	1.70 H	47	41.8	1.4
6	4960.00	34.0 AV	54.0	-20.0	1.70 H	47	32.6	1.4
7	7440.00	49.3 PK	74.0	-24.7	1.64 H	114	42.0	7.3
8	7440.00	38.6 AV	54.0	-15.4	1.64 H	114	31.3	7.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	100.3 PK			1.80 V	209	103.4	-3.1
2	*2480.00	94.5 AV			1.80 V	209	97.6	-3.1
3	2483.50	59.0 PK	74.0	-15.0	1.80 V	209	62.1	-3.1
4	2483.50	47.4 AV	54.0	-6.6	1.80 V	209	50.5	-3.1
5	4960.00	41.7 PK	74.0	-32.3	2.60 V	360	40.3	1.4
6	4960.00	34.2 AV	54.0	-19.8	2.60 V	360	32.8	1.4
7	7440.00	49.2 PK	74.0	-24.8	1.59 V	225	41.9	7.3
8	7440.00	39.9 AV	54.0	-14.1	1.59 V	225	32.6	7.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

Below 1GHz Data:

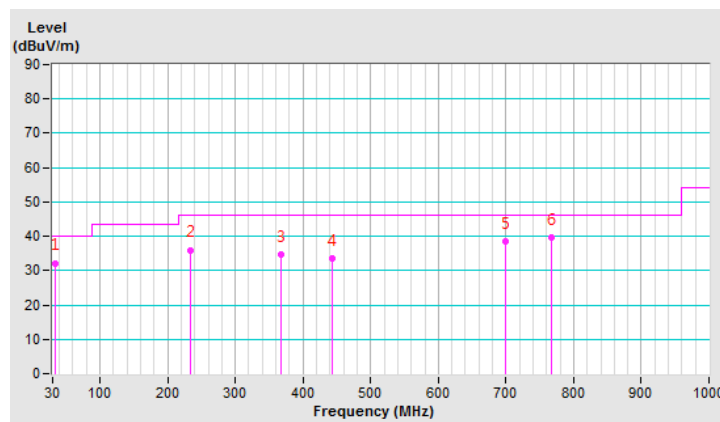
BT_GFSK

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	33.54	32.2 QP	40.0	-7.8	2.00 H	197	51.4	-19.2
2	233.34	36.0 QP	46.0	-10.0	1.00 H	104	55.8	-19.8
3	366.69	34.6 QP	46.0	-11.4	1.00 H	356	50.5	-15.9
4	442.57	33.6 QP	46.0	-12.4	2.00 H	62	47.2	-13.6
5	700.00	38.5 QP	46.0	-7.5	3.00 H	0	47.5	-9.0
6	766.67	39.5 QP	46.0	-6.5	1.00 H	93	47.3	-7.8

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 other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

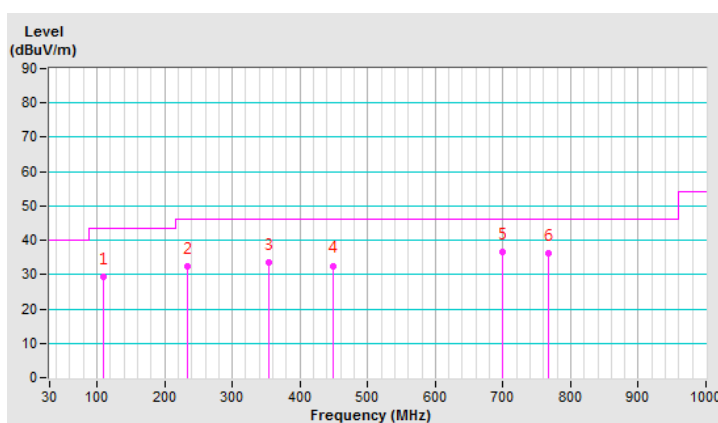


CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	109.59	29.5 QP	43.5	-14.0	4.00 V	108	50.4	-20.9
2	233.34	32.5 QP	46.0	-13.5	1.00 V	87	52.3	-19.8
3	354.85	33.5 QP	46.0	-12.5	1.00 V	2	49.7	-16.2
4	448.48	32.6 QP	46.0	-13.4	1.00 V	344	46.1	-13.5
5	700.00	36.7 QP	46.0	-9.3	2.00 V	286	45.7	-9.0
6	766.67	36.1 QP	46.0	-9.9	2.00 V	324	43.9	-7.8

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 other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
- 3 Tested Date: Aug. 21, 2019

4.2.3 Test Procedures

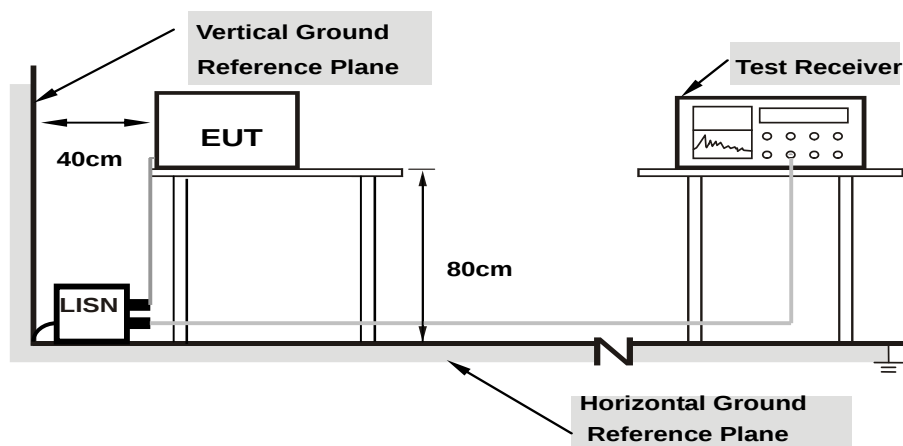
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

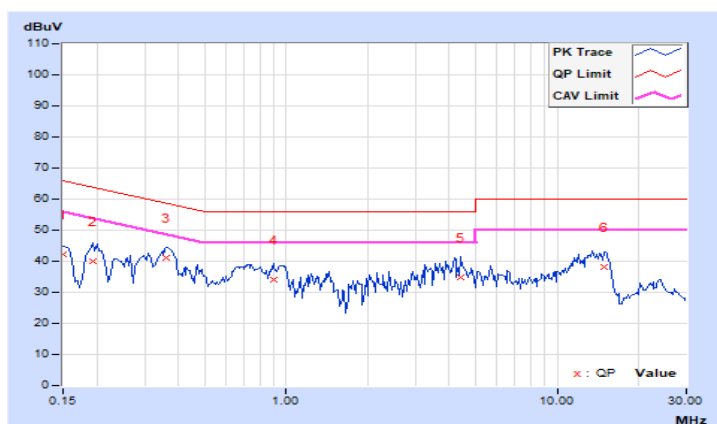
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.96	32.31	23.38	42.27	33.34	66.00	56.00	-23.73	-22.66
2	0.19297	9.97	30.18	20.65	40.15	30.62	63.91	53.91	-23.76	-23.29
3	0.36094	9.98	31.01	16.83	40.99	26.81	58.71	48.71	-17.72	-21.90
4	0.89609	10.02	23.94	11.12	33.96	21.14	56.00	46.00	-22.04	-24.86
5	4.40625	10.29	24.68	12.66	34.97	22.95	56.00	46.00	-21.03	-23.05
6	14.98828	11.00	27.03	19.15	38.03	30.15	60.00	50.00	-21.97	-19.85

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

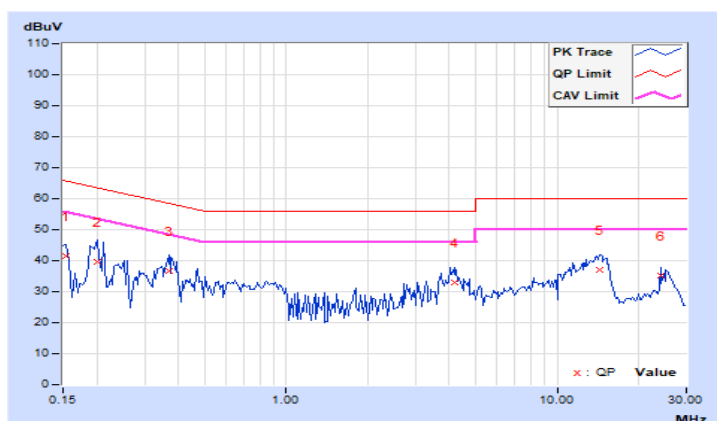


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.95	31.50	17.11	41.45	27.06	65.79	55.79	-24.34	-28.73
2	0.20078	9.95	29.74	16.01	39.69	25.96	63.58	53.58	-23.89	-27.62
3	0.36875	9.97	26.56	13.60	36.53	23.57	58.53	48.53	-22.00	-24.96
4	4.16016	10.20	22.62	9.34	32.82	19.54	56.00	46.00	-23.18	-26.46
5	14.44531	10.79	26.20	15.55	36.99	26.34	60.00	50.00	-23.01	-23.66
6	24.23047	11.17	23.94	15.49	35.11	26.66	60.00	50.00	-24.89	-23.34

Remarks:

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

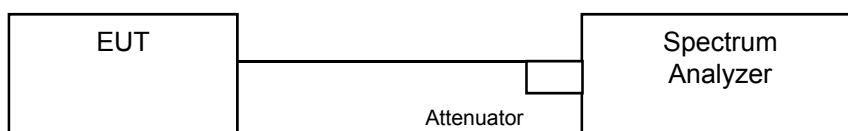


4.3 Number of Hopping Frequency Used

4.3.1 Limits of Hopping Frequency Used Measurement

At least 15 channels frequencies, and should be equally spaced.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

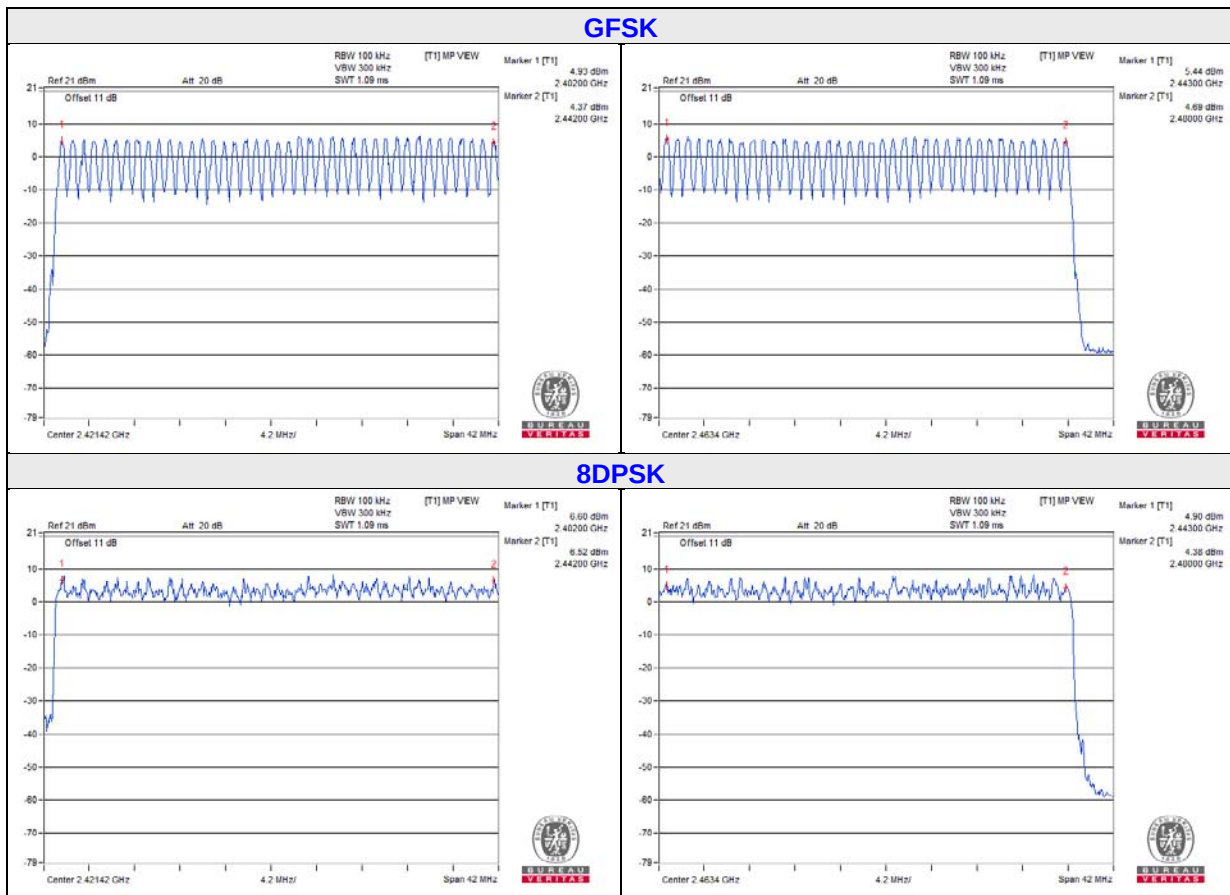
- Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- Set the SA on View mode and then plot the result on SA screen.
- Repeat above procedures until all frequencies measured were complete.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 Test Results

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

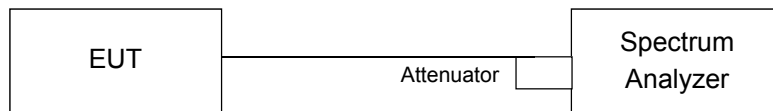


4.4 Dwell Time on Each Channel

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

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

4.4.5 Deviation from Test Standard

No deviation.

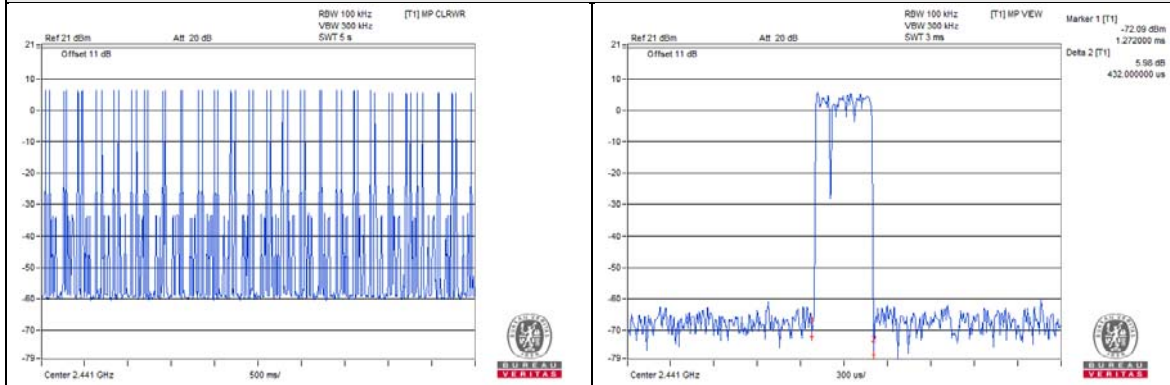
4.4.6 Test Results

GFSK

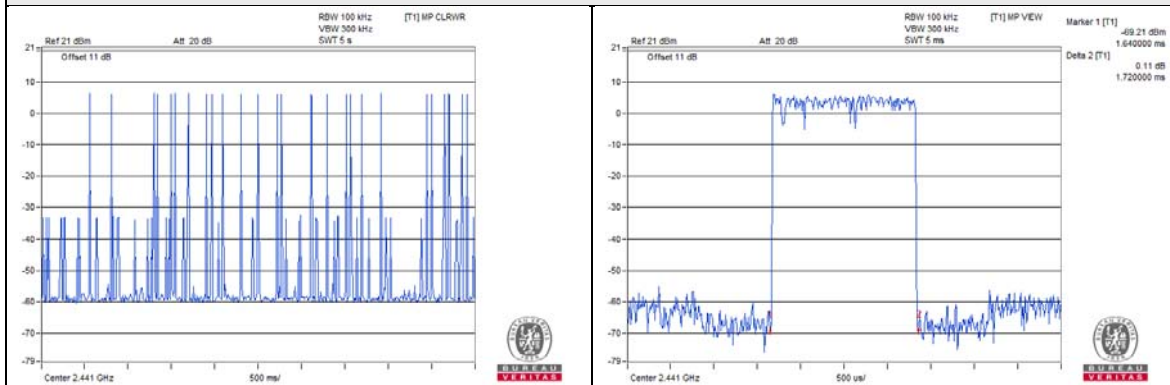
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) * 6.32 = 316 times	0.432	136.51	400
DH3	26 (times / 5 sec) * 6.32 = 164.32 times	1.72	282.63	400
DH5	14 (times / 5 sec) * 6.32 = 88.48 times	2.944	260.49	400

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

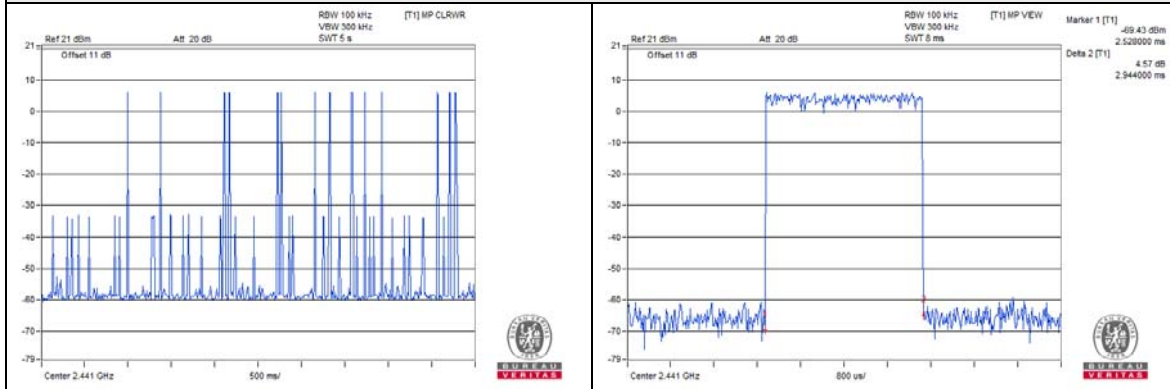
DH1



DH3



DH5

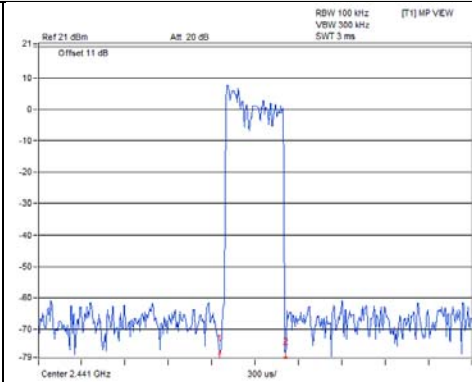
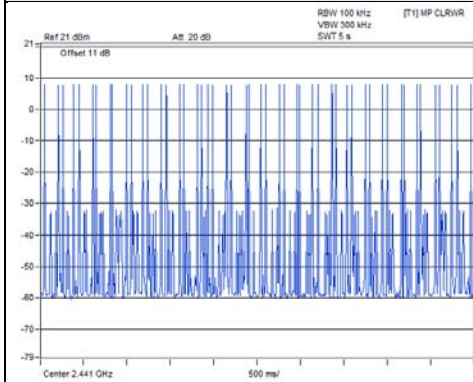


8DPSK

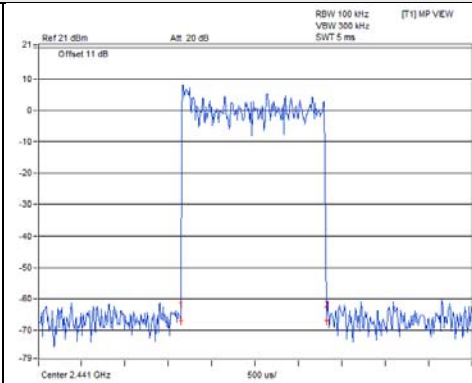
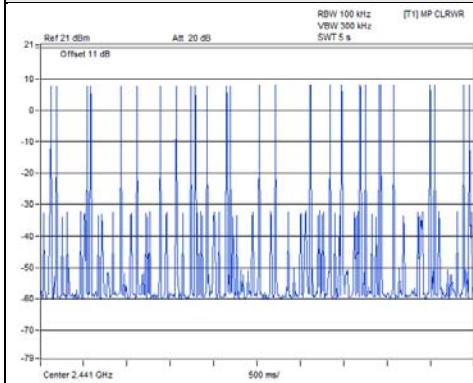
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
3DH1	50 (times / 5 sec) * 6.32 = 316 times	0.456	144.1	400
3DH3	27 (times / 5 sec) * 6.32 = 170.64 times	1.68	286.68	400
3DH5	16 (times / 5 sec) * 6.32 = 101.12 times	2.992	302.55	400

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

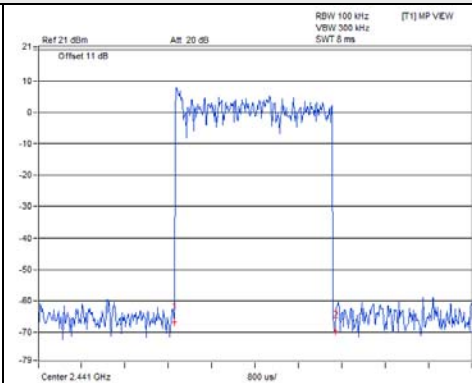
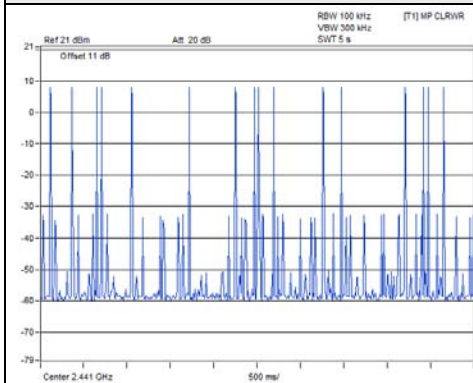
3DH1



3DH3



3DH5

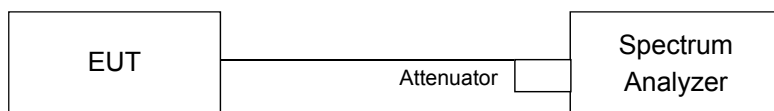


4.5 Channel Bandwidth

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 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

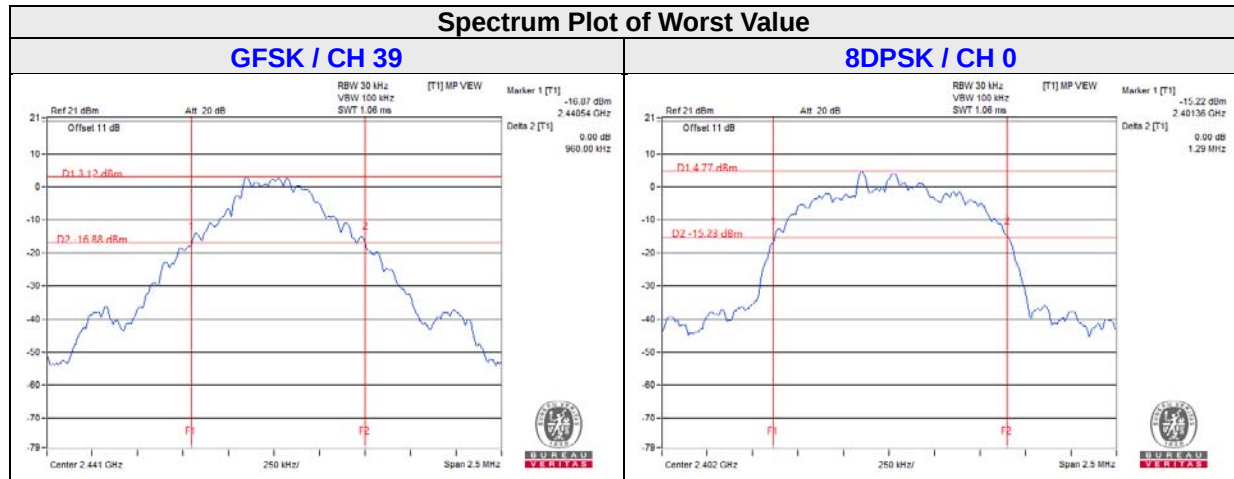
No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	
		GFSK	8DPSK
0	2402	0.95	1.29
39	2441	0.96	1.29
78	2480	0.96	1.29

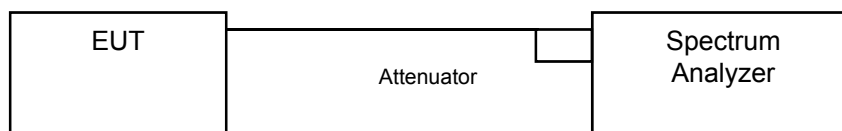


4.6 Hopping Channel Separation

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.

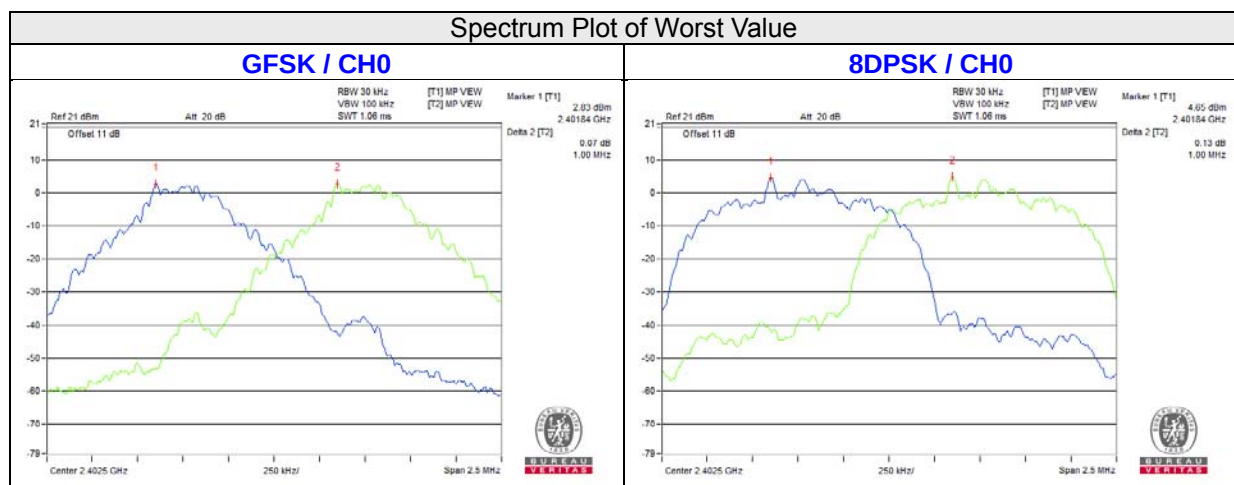
4.6.5 Deviation from Test Standard

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	1.29	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	0.96	1.29	0.64	0.86	Pass

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

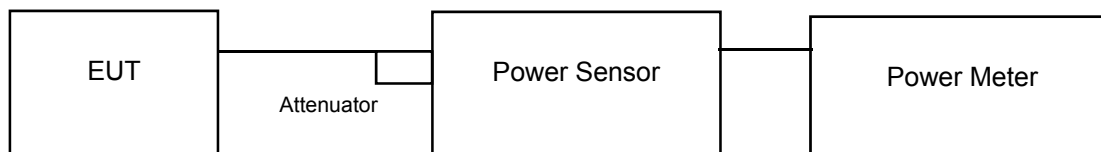


4.7 Maximum Output Power

4.7.1 Limits of Maximum Output Power Measurement

The Maximum Output Power Measurement is 125mW.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

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)	GFSK		8DPSK		Power Limit (mW)	Pass / Fail
		Output Power (mW)	Output Power (dBm)	Output Power (mW)	Output Power (dBm)		
0	2402	4.305	6.34	7.907	8.98	21.00	Pass
39	2441	4.159	6.19	7.586	8.80	21.00	Pass
78	2480	4.178	6.21	7.311	8.64	21.00	Pass

FOR AVERAGE POWER

Channel	Frequency (MHZ)	GFSK		8DPSK	
		Average Power (mW)	Average Power (dBm)	Average Power (mW)	Average Power (dBm)
0	2402	3.926	5.94	3.917	5.93
39	2441	3.75	5.74	3.767	5.76
78	2480	3.758	5.75	3.664	5.64

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 Resolution Bandwidth).

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.

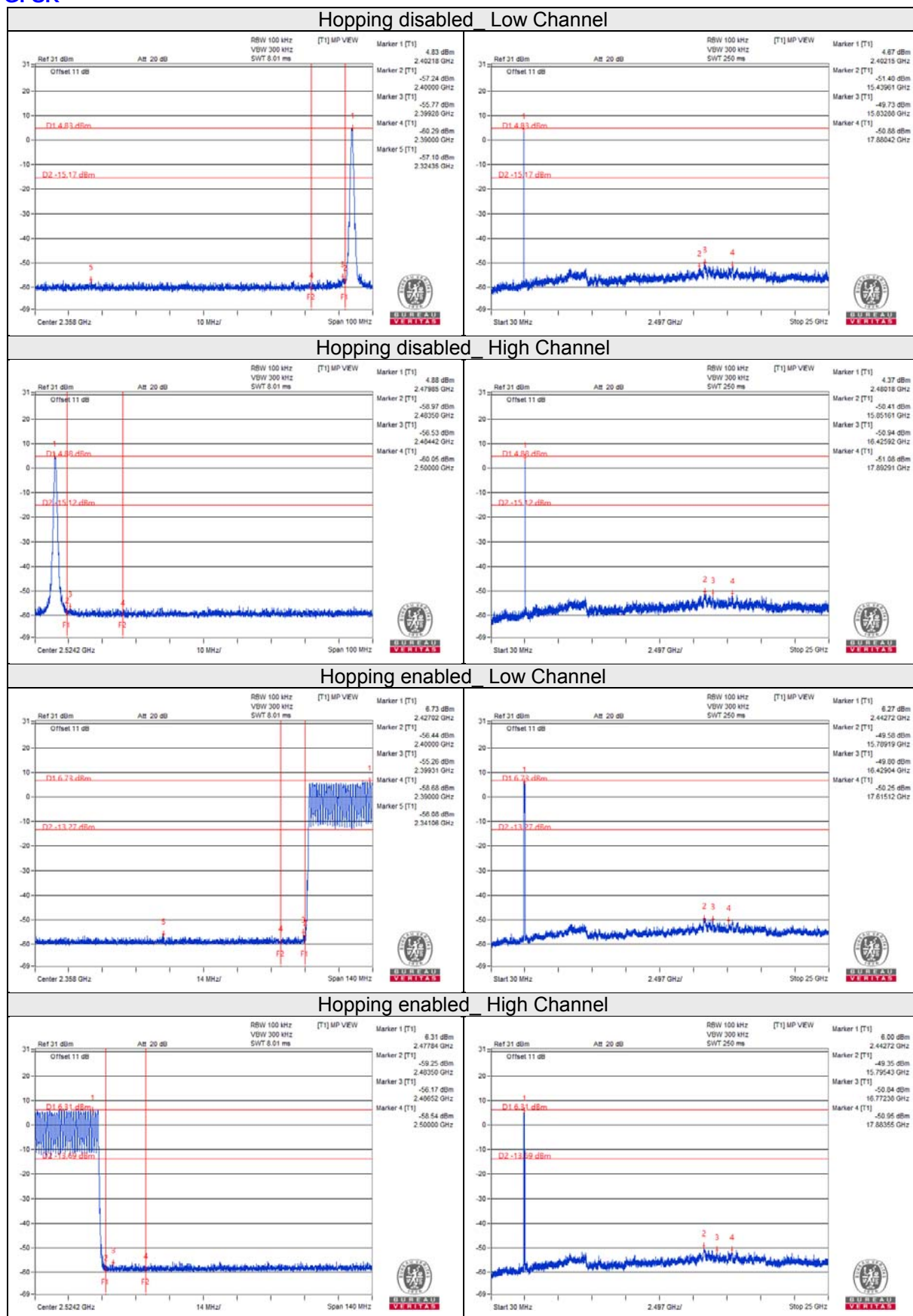
4.8.5 EUT Operating Condition

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

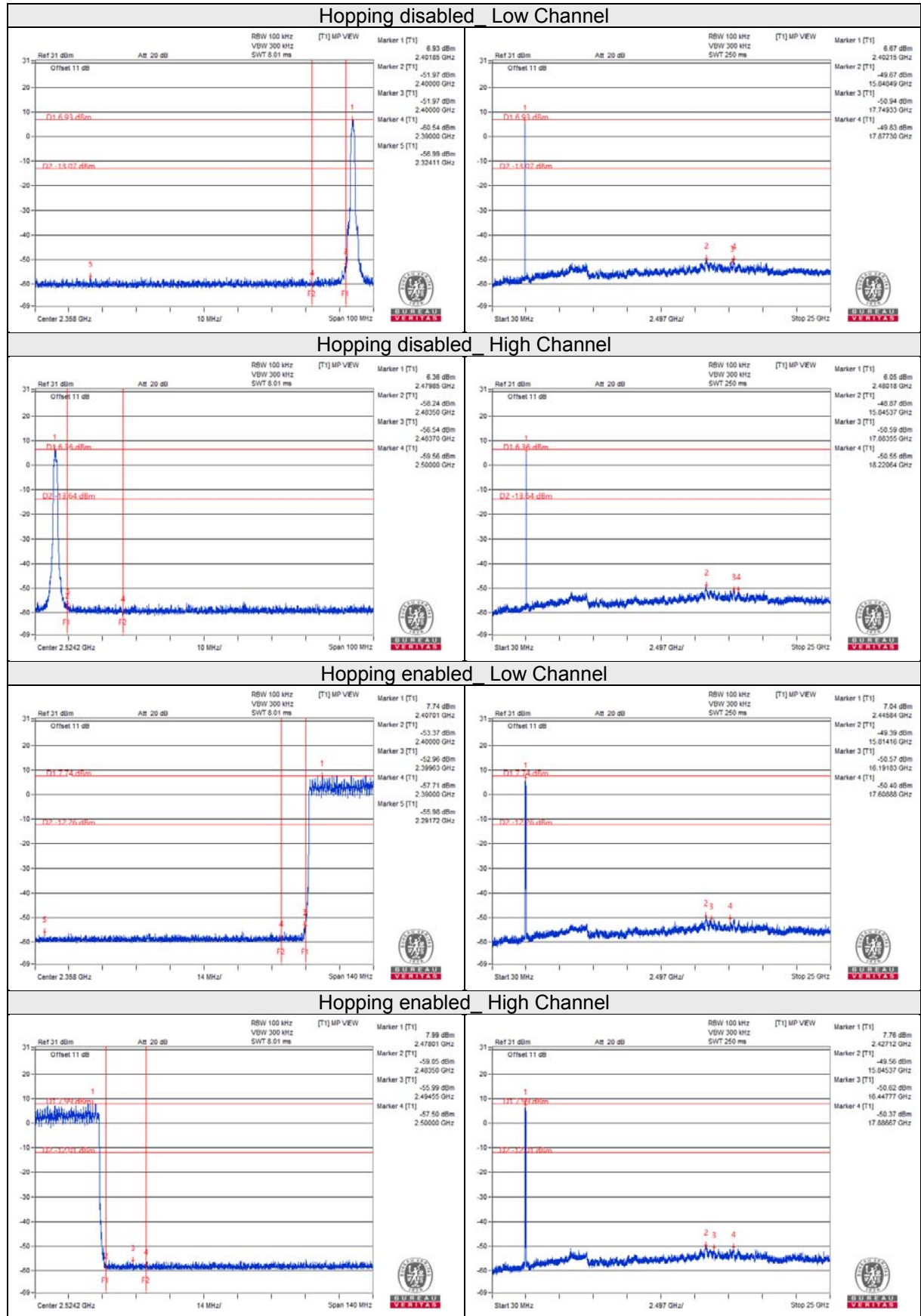
4.8.6 Test Results

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



8DPSK



5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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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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