FCC Test Report

Report No.: AGC10576170701FE03

FCC ID	: 2AM8GCHAMELEON	
APPLICATION PURPOSE	: Original Equipment	
PRODUCT DESIGNATION	: IP54 - IP 67 Rugged Handheld, Desktop & Tablet Devices	
BRAND NAME	: LAXTON	
MODEL NAME CLIENT	 Chameleon, LAXTAB2000, LAXHND2000, LAXDSK2000, LAXBIO2000, LAXCAM2000, LAXSIG2000, LAXSCN2000, LAXACS2000, LAX80x, LAX50x, Chameleon 5, Chameleon 8 Chameleon Q, Chameleon C, Chameleon 50x, Chameleon 80: Chameleon Q0x, Chameleon C0x GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED 	
DATE OF ISSUE	: July 12, 2017	
STANDARD(S) TEST PROCEDURE(S)	FCC Part 15 Rules ANSI C63.10 (2013)	
REPORT VERSION	: V1.0	

Attestation of Global Compliance (Shenzhen) Co., Ltd



CAUTION: This report shall not be reproduced except in full without the written permission of the test laboratory and shall not be quoted out of context?



Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	July 12, 2017	Valid	Original Report

TABLE OF CONTENTS

1.	VERIFICATION OF CONFORMITY	. 5
2.	GENERAL INFORMATION	. 6
	2.1. PRODUCT DESCRIPTION	6
	2.2. TABLE OF CARRIER FREQUENCYS	6
	2.3. RECEIVER INPUT BANDWIDTH	7
	2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE	7
	2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR	7
	2.6. RELATED SUBMITTAL(S) / GRANT (S)	8
	2.7. TEST METHODOLOGY	8
	2.8. SPECIAL ACCESSORIES	8
	2.9. EQUIPMENT MODIFICATIONS	8
3.	MEASUREMENT UNCERTAINTY	. 9
4.	DESCRIPTION OF TEST MODES	. 9
5.	SYSTEM TEST CONFIGURATION	. 9
	5.1. CONFIGURATION OF EUT SYSTEM	9
	5.2. EQUIPMENT USED IN EUT SYSTEM	. 10
	5.3. SUMMARY OF TEST RESULTS	. 10
6.	TEST FACILITY	11
7.	PEAK OUTPUT POWER	13
	7.1. MEASUREMENT PROCEDURE	. 13
	7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	. 13
	7.3. LIMITS AND MEASUREMENT RESULT	. 13
8.	20DB BANDWIDTH	16
	8.1. MEASUREMENT PROCEDURE	. 16
	8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	. 16
	8.3. LIMITS AND MEASUREMENT RESULTS	. 16
9.	CONDUCTED SPURIOUS EMISSION	19
	9.1. MEASUREMENT PROCEDURE	. 19
	9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	. 19
	9.3. MEASUREMENT EQUIPMENT USED	. 19
	9.4. LIMITS AND MEASUREMENT RESULT	. 19
10	RADIATED EMISSION	25
	10.1. MEASUREMENT PROCEDURE	25
	10.2. TEST SETUP	. 26
	10.3. LIMITS AND MEASUREMENT RESULT	. 27

Report No.: AGC10576170701FE03 Page 4 of 46

10.4. TEST RESULT	
11. BAND EDGE EMISSION	31
11.1. MEASUREMENT PROCEDURE	31
11.2. TEST SET-UP	31
11.3. Radiated TEST RESULT	
11.4 Conducted TEST RESULT	
12. NUMBER OF HOPPING FREQUENCY	37
12.1. MEASUREMENT PROCEDURE	37
12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	37
12.3. MEASUREMENT EQUIPMENT USED	37
12.4. LIMITS AND MEASUREMENT RESULT	37
13.1. MEASUREMENT PROCEDURE	
13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	38
13.3. MEASUREMENT EQUIPMENT USED	38
13.4. LIMITS AND MEASUREMENT RESULT	38
Test Graph	39
14. FREQUENCY SEPARATION	40
14.1. MEASUREMENT PROCEDURE	40
14.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	40
14.3. MEASUREMENT EQUIPMENT USED	40
14.4. LIMITS AND MEASUREMENT RESULT	_
15. FCC LINE CONDUCTED EMISSION TEST	41
15.1. LIMITS OF LINE CONDUCTED EMISSION TEST	
15.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST	
15.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	
15.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	
15.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST	43
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	45

Applicant	GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED	
Address	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District, Guangzhou	
Manufacturer	GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO. LIMITED	
Address	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu District, Guangzhou	
Product Designation	IP54 - IP 67 Rugged Handheld, Desktop & Tablet Devices	
Brand Name	LAXTON	
Test Model Chameleon		
Series Model	LAXTAB2000, LAXHND2000, LAXDSK2000, LAXBIO2000, LAXCAM2000, LAXSIG2000, LAXSCN2000, LAXACS2000, LAX80x, LAX50x, Chameleon 5, Chameleon 8, Chameleon Q, Chameleon C, Chameleon 50x, Chameleon 80x, Chameleon Q0x, Chameleon C0x	
Difference Description	All the same except the appearance.	
Date of test	July 01, 2017~July 12, 2017	
Deviation	None	
Condition of Test Sample	Normal	
Report Template	AGCRT-US-BR/RF	

1. VERIFICATION OF CONFORMITY

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.247.

donjon strong Tested By Donjon Huang(Huang July 12, 2017 Dongyang) BOR , xie Reviewed By Bart Xie(Xie Xiaobin) July 12, 2017 Approved By Solger Zhang(Zhang Hongyi) July 12, 2017 Authorized Officer

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is "IP54 - IP 67 Rugged Handheld, Desktop & Tablet Devices " designed as a "Communication Device". It is designed by way of utilizing the FHSS technology to achieve the system operation.

Operation Frequency	2.402 GHz to 2.480GHz		
Bluetooth Version	V 3.0		
Modulation	GFSK, π/4-DQPSK, 8DPSK		
Number of channels	79(For BR/EDR)		
Hardware Version	V1.3		
Software Version	V1.3		
Antenna Designation	PIFA Antenna		
Antenna Gain	0.7dBi		
Power Supply	DC3.7V by Battery		

A major technical description of EUT is described as following

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	0	2402MHZ
	1	2403MHZ
	•••	:
	38	2440 MHZ
2400~2483.5MHZ	39	2441 MHZ
	40	2442 MHZ
		:
	77	2479 MHZ
	78	2480 MHZ

2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHZ, In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection(e.g. single of multislot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.

Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a 79 hopping sequence in data mode: 40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67 56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59 72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75 09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06 01, 51, 03, 55, 05, 04

2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values: 1. LAP/UAP of the master of the connection.

2. Internal master clock

The LAP(lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP(upper address part) are the 24MSB's of the 48BD_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For ehavior zation with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us.The clock has a cycle of about one day(23h30).In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire. LAP(24 bits),4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With this input values different mathematical procedures(permutations, additions, XOR-operations)are performed to generate te Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following ehavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer(and it Cannot be shorter) than the minimum resolution of the clock(312.5us). The hopping sequence will always Differ from the first one.

2.6. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AM8GCHAMELEON** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.7. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. MEASUREMENT UNCERTAINTY

Conducted measurement: +/- 2.75dB Radiated measurement: +/- 3.2dB

4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION			
1	Low channel GFSK			
2	Middle channel GFSK			
3	High channel GFSK			
4	Low channel π /4-DQPSK			
5	Middle channel π /4-DQPSK			
6	High channel π /4-DQPSK			
7	Low channel 8DPSK			
8	Middle channel 8DPSK			
9	High channel 8DPSK			
10	Normal Hopping			
Mater				

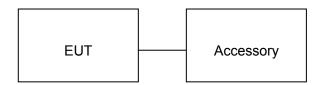
Note:

1. All the test modes can be supply by Built-in Li-ion battery, only the result of the worst case was recorded in the report, if no other cases.

2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM Configuration:



5.2. EQUIPMENT USED IN EUT SYSTEM

ltem	Equipment	Model No.	ID or Specification	Remark		
1	IP54 - IP 67 Rugged Handheld, Desktop & Tablet Devices	Chameleon	FCC ID: 2AM8GCHAMELEON	EUT		
2	Adapter	BYX-0505000M	DC 5.0V/5A	Accessory		
3	Battery	4890108P-1S2P	DC3.7V/ 13000mAh	Accessory		
4	USB Cable	N/A	N/A	Accessory		

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Peak Output Power	Compliant
§15.247	20 dB Bandwidth	Compliant
§15.247	Spurious Emission	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant
§1 5.207	Conduction Emission	Compliant
§15.247	Number of Hopping Frequency	Compliant
§15.247	Time of Occupancy	Compliant
§15.247	Frequency Separation Compliant	

6. TEST FACILITY

Site	Dongguan Precise Testing Service Co., Ltd.
Location Building D,Baoding Technology Park,Guangming Road2,Dongcheng District, Dongguan, Guangdong, China,	
FCC Registration No. 371540	
Description The test site is constructed and calibrated to meet the FCC requirem documents ANSI C63.10:2013.	

ALL TEST EQUIPMENT LIST

FOR RADIATED EMISSION TEST (BELOW 1GHZ)

Radiated Emission Test Site						
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration	
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017	
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 2, 2017	July 1, 2018	
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 3, 2016	July 2, 2017	
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 2, 2017	July 1, 2018	
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 3, 2016	July 2, 2017	
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 2, 2017	July 1, 2018	
RF Cable	SCHWARZBECK	AK9515E	96221	July 3, 2016	July 2, 2017	
RF Cable	SCHWARZBECK	AK9515E	96221	July 2, 2017	July 1, 2018	
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 2, 2017	June 1, 2018	
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A	
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 2, 2017	June 1, 2018	
Spectrum analyzer	Agilent	E4407B	MY46185649	June 2, 2017	June 1, 2018	
Power Probe	R&S	NRP-Z23	100323	July 24,2016	July 23,2017	
RF attenuator	N/A	RFA20db	68	N/A	N/A	

FOR RADIATED EMISSION TEST (1GHZ ABOVE)

Radiated Emission Test Site						
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration	
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017	
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 2, 2017	July 1, 2018	
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	July 10, 2016	July 9, 2018	

Spectrum Analyzer	Agilent	E4411B	MY4511453	July 3, 2016	July 2, 2017
Spectrum Analyzer	Agilent	E4411B	MY4511453	July 2, 2017	July 1, 2018
Signal Amplifier	SCHWARZBECK	BBV 9718	9718-269	July 6, 2016	July 5, 2017
RF Cable	SCHWARZBECK	AK9515H	96220	July 7, 2016	July 6, 2017
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 2, 2017	June 1, 2018
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 2, 2017	June 1, 2018
Power Probe	R&S	NRP-Z23	100323	July 24,2016	July 23,2017
RF attenuator	N/A	RFA20db	68	N/A	N/A

	Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration	
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017	
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 2, 2017	July 1, 2018	
Artificial Mains Network	Narda	L2-16B	000WX31025	July 7, 2016	July 6, 2017	
Artificial Mains Network	Narda	L2-16B	000WX31025	July 2, 2017	July 1, 2018	
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 7, 2016	July 6, 2017	
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 2, 2017	July 1, 2018	
RF Cable	SCHWARZBECK	AK9515E	96222	July 3, 2016	July 2, 2017	
RF Cable	SCHWARZBECK	AK9515E	96222	July 2, 2017	July 1, 2018	
Shielded Room	CHENGYU	843	PTS-002	June 2, 2017	June 1, 2018	

7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, middle and the bottom operation frequency individually.
- 3. RBW > the 20 dB bandwidth of the emission being measured, VBW \ge RBW.
- 4. Record the maximum power from the Spectrum Analyzer.

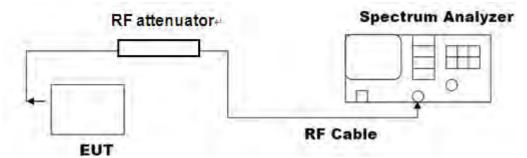
For average power test:

- 1. Connect EUT RF output port to power probe through an RF attenuator.
- 2. Connect the power probe to the PC.
- 3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 4. Record the maximum power from the software.

Note: The EUT was tested according for compliance ANSI C63.10 (2013) requirements.

7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

PEAK POWER TEST SETUP



7.3. LIMITS AND MEASUREMENT RESULT

Mode	Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
	2.402	2.063	30	Pass
GFSK	2.441	2.707	30	Pass
	2.480	2.301	30	Pass

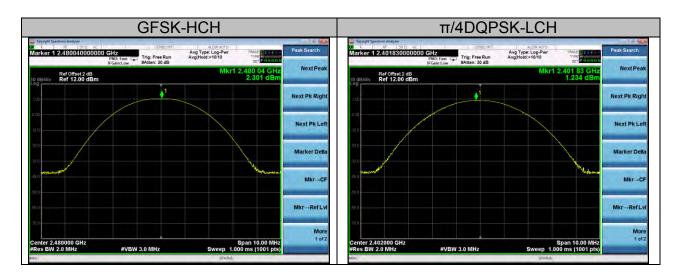
Mode	Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
	2.402	1.234	30	Pass
π/4-DQPSK	2.441	2.890	30	Pass
	2.480	2.109	30	Pass

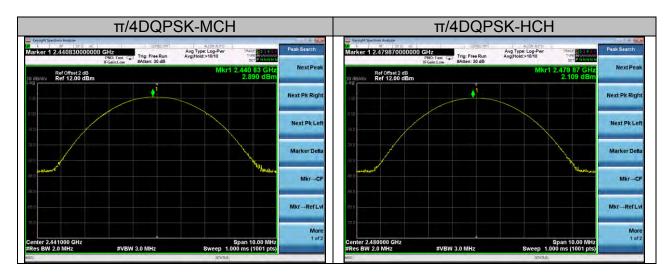
Report No.: AGC10576170701FE03 Page 14 of 46

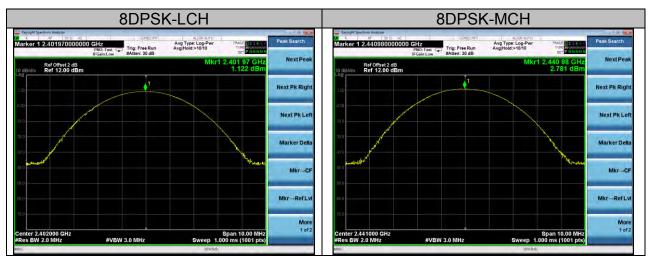
Mode	Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
	2.402	1.122	30	Pass
8DPSK	2.441	2.781	30	Pass
	2.480	2.032	30	Pass

Test Graph

GF	SK-LCH			GFSK-MCH	
Marker 1 2.401790000000 GHz IF A State: IF CainLow IF CainLow IF CainLow	Avg Type: Log-Pwr TRACE 12 4 4 4 e Run Avg Hold:>10/10 TVFE 0 dB DET CONTINUE	eak Search Next Peak	Keysight Spectrum Asalyzer L NF SPI2 AC Center Freq 2.441000000 GHz PNO: Fast IFGainLow	#Atten: 30 dB	Pwr TRACE 12 14 Frequency
Ref Offset 2 dB 10 dB/div Ref 12.00 dBm	Mkr1 2.401 79 GHz 2.063 dBm	NextPeak	Ref Offset 2 dB 10 dB/div Ref 12.00 dBm		Mkr1 2.440 83 GHz 2.707 dBm
2.00	N	ext Pk Right	1.00	A 1	Center Freq 2.441000000 GHz
800		Next Pk Left	015		Start Freq 2.43600000 GHz
300		Marker Delta	300		Stop Freq 2.445000000 GHz
-62.0	Normal State	Mkr→CF	-20 -		CF Step 1.00000 MHz <u>Auto</u> Man
60.0		Mkr→RefLvi	-68.0		Freq Offset 0 Hz
Center 2.402000 GHz	Span 10.00 MHz	More 1 of 2	Center 2.441000 GHz		Scale Type Span 10.00 MHz
#Res BW 2.0 MHz #VBW 3.0 MH2	sweep 1.000 ms (1001 pts)		#Res BW 2.0 MHz #VE		ep 1.000 ms (1001 pts)







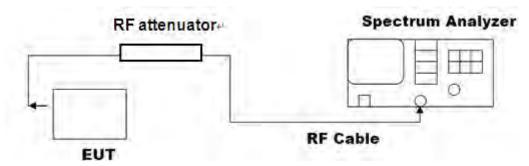


8. 20DB BANDWIDTH

8.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hoping channel RBW ≥ 1% of the 20 dB bandwidth, VBW ≥ RBW; Sweep = auto; Detector function = peak
- 4. Set SPA Trace 1 Max hold, then View.

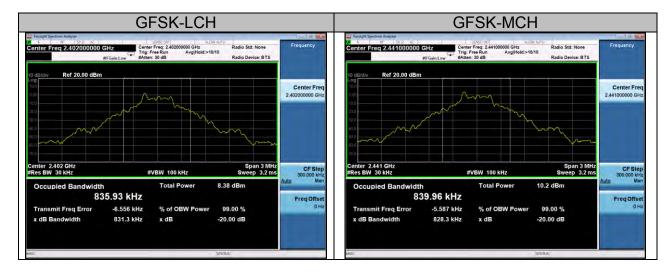
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

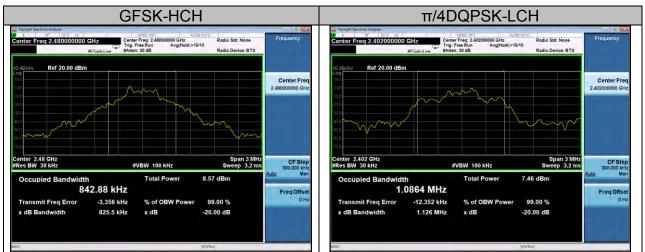


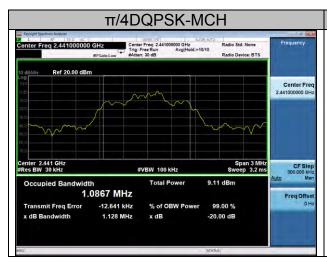
8.3. LIMITS AND MEASUREMENT RESULTS

Mode	Channel.	20dB Bandwidth [KHz]	Verdict
GFSK	LCH	831.3	PASS
GFSK	MCH	828.3	PASS
GFSK	НСН	825.5	PASS
π/4DQPSK	LCH	1126	PASS
π/4DQPSK	MCH	1128	PASS
π/4DQPSK	HCH	1128	PASS
8DPSK	LCH	1123	PASS
8DPSK	MCH	1122	PASS
8DPSK	HCH	1121	PASS

Test Graph













9. CONDUCTED SPURIOUS EMISSION

9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
- Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic. RBW = 100 kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak.
- 4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according for compliance ANSI C63.10 (2013) requirements. Owing to satisfy the requirements of the number of measurement points, we set the RBW=1MHz, VBW > RBW, scan up through 10th harmonic, and consider the tested results as the worst case, if the tested results conform to the requirement, we can deem that the real tested results(set the RBW=100KHz, VBW > RBW) are conform to the requirement.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2

9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

9.4. LIMITS AND MEASUREMENT RESULT

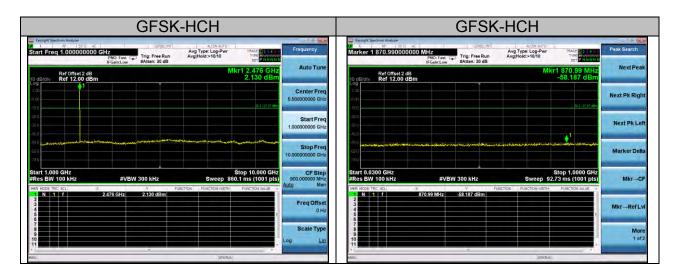
LIMITS AND MEASUREMENT RESULT				
Angliachta Limite	Measurement Result			
Applicable Limits	Test Data	Criteria		
In any 100 KHz Bandwidth Outside the	At least -20dBc than the limit			
frequency band in which the spread spectrum	Specified on the BOTTOM	PASS		
intentional radiator is operating, the radio frequency	Channel			
power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -20dBc than the limit Specified on the TOP Channel	PASS		

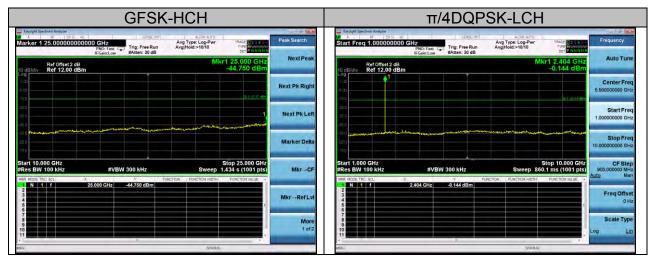
Test Graph

GFSK-LCH		GFSK-LCH
The Proventier Section Analysis of the Section Analysi	Frequency	Trigs Free Run Arter 1 910.750000000 MHz: Frigs Free Run Artgiffeid-1610 Frigs Free Run Frigs Free Frigs Frigs Free Frigs Frigs Free Frigs Free Frigs Free Frigs Free Frig
Ref Offset2 dB Mkr1 2.404 GHz 10 dB/div Ref 12.00 dBm 1.982 dBm	Auto Tune	Ref Offset2 dB Mkr1 910.76 MHz NextPeak 10 dB/ddv Ref 12.00 dBm -58.153 dBm
	Center Freq 5.500000000 GHz	200 Next Pk Right
	Start Freq 1.000000000 GHz	Next Pk Left
80 20 20	Stop Freq 10.000000000 GHz	(a) Centra and A A A Stranger and A
Start 1.000 GHz Stop 10.000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 860.1 ms (1001 pts)	CF Step 900.000000 MHz Auto Man	Start 0.0300 GHz Stop 1.0000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 92.73 ms (1001 pts) MkrCF
NPM ROCE THC SLI X. Y. FUNCTION POINT/DOW/NDTH PUNCTION VALUE Y 1 N 1 f 2.404 GHz 1.982 dBm F 2.404 GHz 1.982 dBm F 2.404 GHz 1.982 dBm F 7 <td>Freq Offset 0 Hz</td> <td>Image Trace, sec. x y Function Function worth Func</td>	Freq Offset 0 Hz	Image Trace, sec. x y Function Function worth Func
	Scale Type	More 10
NSG STATIS		assci stratas

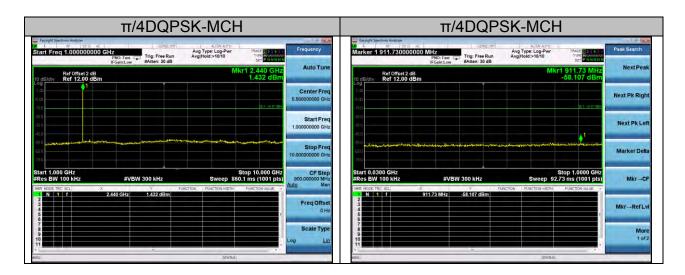
GFSK-LCH		GFSK-MCH
Anglet Section Analysis Arrow 1 2459550000000000 GHz Proc Fast Proc F	Peak Search Next Peak	Triger Start Freq 1.000000000 GHz Triger Fee Run Start Freq 1.0000000000 GHz Triger Fee Run EFGala.cov Triger Fee Run Starts 20 dB Start S
Ref Offset 2 dB Mkr1 24.955 GHz 10 dB/dv Ref 12.00 dBm -46.017 dBm	NextPeak	Ref Offset 2 dB Mkr1 2.440 GHz
20 Am 60 20 20 20 20 20 20 20 20 20 20 20 20 20	Next Pk Right	2.0 Center Freq 0.0 2.0 Center Freq 0.0 Center Freq 0.0 Center Freq 0.0 Center Freq 0.0 Center Freq
	Next Pk Left	30 Start Freq 31 00000000 GHz
	Marker Delta	Stop Freq
Star 10.000 GHz Stop 25.000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.434 s (1001 pts)	Mkr→CF	Start 1.000 GHz Stop 10.000 GHz GF Step #Res BW 100 kHz #VBW 300 kHz Sweep 860.1 ms (1001 pts)
WR MORETE SC	Mkr→Ref Lvi	International control solution X Y Function
	More 1 of 2	Scale Type
e Historia (Status)		NEG STATIS

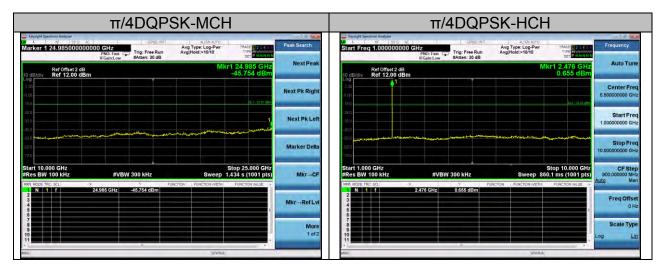
GFSK-MCH		GFSK-MCH
Torget Sectors Adapt 400 at 100	Peak Search Next Peak	Markor 1 24.94000000000 CH2 Markor 1 24.94000000000 CH2 Figurizow Figurizo
D dBdelv Ref 12.00 dBm -57.695 dBm -57.695 dBm	Next Pk Right	Ref Offset 2 dB Mkr1 24.940 GHz 10 dEkinv Ref 12.00 dBm -45.147 dBm 200
80	Next Pk Left	200
	Marker Delta	Image: Source and a second
art 0.0300 GHz Stop 1.0000 GHz Res BW 100 kHz SWeep 92.73 ms (1001 pb) R dece ms su	Mkr-+CF	Start 10.000 GHz Stop 25.000 GHz Ress BW 100 kHz SVBW 300 kHz Sveep 1.434 s (1001 pts) MM INCE TG 50,1 x 1 runction within Interformation Interformation
N 1 f 968.36 MHz -57.695 dBm	Mkr→RefLvi	1 N 1 f 24.940 GHz 45.147 dBm 2 N 1 f 24.940 GHz 45.147 dBm 5 S S S S S S S S S S S S S S S S S S S
	More 1 of 2	7 9 10 11
srans		A STATUS





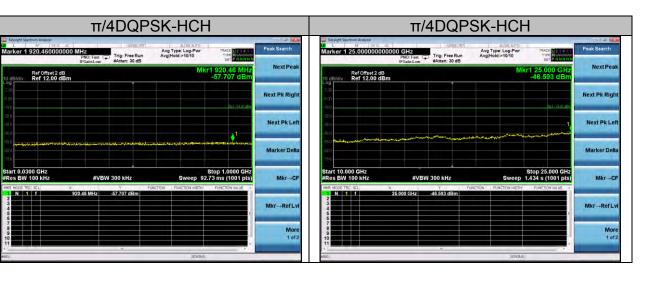
π/4DQF		π/4DQPS	SK-LCH			
Revisite Section Analyzer IDIG: JIII Revisite Section Analyzer IDIG: JIII Marker 1 845.770000000 MHz Trig: Free Run IFGainLow Thister: 30 dB	Aug Type: Log-Pwr Avg Hoid:>10/10 Drive: Distance Avg Hoid:>10/10	Peak Search	Knysight Spectrum Analyzer Key State (Key State	0 GHz PNO: Fast IFGainLow #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>10/10 Trace Det	Peak Search
Ref Offset 2 dB 10 dB/div Ref 12.00 dBm	Mkr1 845.77 MHz -57.983 dBm	Next Peak	Ref Offset 2 dB 10 dB/div Ref 12.00 dBm		Mkr1 24.46 -46.12	60 GHz Next Peak 11 dBm
2:00 6:00 -19:0	N	lext Pk Right	2 dD 			Next Pk Right
260 		Next Pk Left	- 40 0 - 40 0 - 40 0			Next Pk Left
#0 		Marker Delta	-58 0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	in an	Marker Delta
Start 0.0300 GHz #Res BW 100 kHz #VBW 300 kHz	Stop 1.0000 GHz Sweep 92.73 ms (1001 pts)	Mkr→CF	Start 10.000 GHz #Res BW 100 kHz	#VBW 300 kHz	Stop 25.(Sweep 1.434 s (1	001 pts) Mkr→CF
MMR NODE THC SCL X Y N 1 1 84577 MHz 57.883 dBm 3 4 6		Mkr→RefLvi	MAR MODE TRC SCL X	4.460 GHz -46.121 dBm	TION FUNCTION INDTH FUNCTION	n wicoe Mikr→Ref Lvi
7		More 1 of 2	7 8 9 10 11			More t of 2
\$G	STATIS		MSG		STATUS	



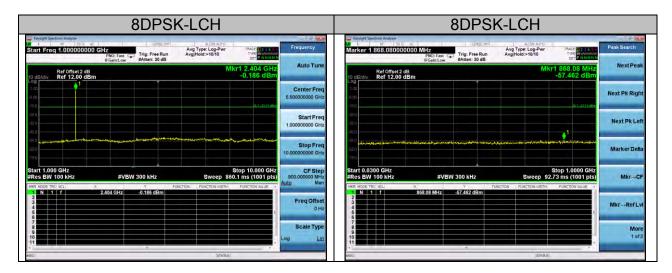


Ref Offset 2 dB Ref 12.00 dBm

Start 0.0300 GHz #Res BW 100 kHz



Report No.: AGC10576170701FE03 Page 23 of 46



8DPSK-LCH		8DPSK-MCH
Internet Sector Analyse Markor 1 24.715000000000 GHz FR0: Tau FR0: Tau Trig: Free Run Fro: Tau Trig: Free Run Fro: Tau Trig: Free Run Free Run Fro: Tau Trig: Free Run Free Ru	Peak Search	Trige Freq 4.00000000 GHz Trige Frequency Avg Type: Log-Part Avg Type:
Ref Offset 2 dB Mkr1 24.715 GHz 10 dB/div Ref 12.00 dBm -46.309 dBm	Next Peak	Ref Offset 2 dB Mkr1 2,440 GHz Auto Tune 2,375 dBm 2,375 dBm
2.00	Next Pk Right	2.02 Center Freq a.m.
	Next Pk Left	358 Start Freq 30 1.00000000 GHz
	Marker Delta	60 Stop Freq 00 10 00000000 GHz 10 00000000 GHz
Start 10.000 GHz Stop 25.000 GHz #Res BW 100 kHz Sweep 1.434 s (100 tpts) with the true sure sure sure sure sure sure sure s	Mkr-+CF	Start 1.000 GHz Stop 10.000 GHz #Res BW 100 HHz #VBW 300 kHz Sweep 860.1 ms (1001 pts) Auto Man
NM NCOR TRACTOR Function Functi	Mkr→RefLvi	MM M I I Z X Y Function worth F
7 8 10	More 1 of 2	Scate Type
4 TT STATUS		MIG) STATUS

8DPSK-MCH		8DPSK-MCH
Conjunt Spectrum Angen Nerkor 1 840.920000000 MHz PRO: Fast Conjunt Sector 1 840.920000000 MHz PRO: Fast Conjunt Sector 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Peak Search	With Registration Registration String Registration String Registration String Registration String Registration String Registration Page Registration Page Registration String Registration Page Registration Pag
Ref Offset 2 dB Mkr1 840.92 MHz 0 dB/div Ref 12.00 dBm -57.028 dBm -57.028 dBm	Next Peak	Ref Offset 2 dB Mkr1 25.000 GHz Next Peak
2.3 0.0 0.0	Next Pk Right	2.0 Next Pk Right
20	Next Pk Left	35 August 20 Aug
	Marker Delta	Marker Delz
tart 0.0300 GHz Stop 1.0000 GHz Res BW 100 kHz #VBW 300 kHz Sweep 92.73 ms (1001 pts)	Mkr→CF	Start 10.000 GHz Stop 25.000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.434 s (1001 pts) Mkr-4CF
AR MORE THE GLU X. Y FUNCTION MOTH FUNCTION MOTH FUNCTION MALE Y A TO BE A CONTRACT OF THE STORE STOR	Mkr→RefLvi	Mark Mode Tho: Sk. X Y Function Function Mode The Sk. X X Y Function Function Mode The Sk. X X Y Function Function Mode The Sk. X X X Y Function Function Function Function Multi- Function Functio
	More 1 of 2	Morr
so, status		4 status



8DPSK-HCH	
Energy Systems Adapt Sign of the system Allocation Marker 1 25.0000000000000 GHz Figs res the system of the system o	Paik Search
Promition Data Constant of Data Constant	Next Peak
2.22. 40.00 100 X01.052.00	Next Pk Right
30 30 40 40	Next Pk Lett
	Marker Della
Start 10.000 GHz Stop 25.000 GHz #Res BW 100 kHz ¥VBW 300 kHz Sweep 1.434 s (1001 pts) #R M MCG TRC SLL × ¥ Paktron Paktron MDL	MkrCF
N 1 1 1 28.000 CH2 48.269 dBm	MixrRefLvi
	More t et 2
ii Istatus	

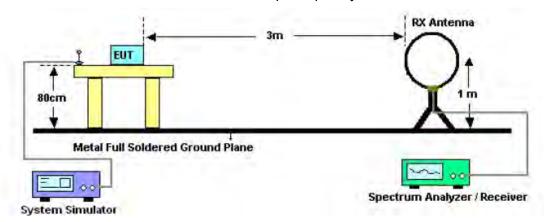
10. RADIATED EMISSION

10.1. MEASUREMENT PROCEDURE

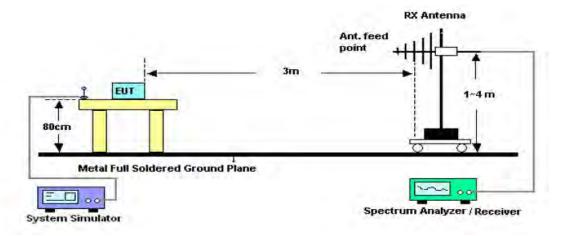
- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8.If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.

10.2. TEST SETUP

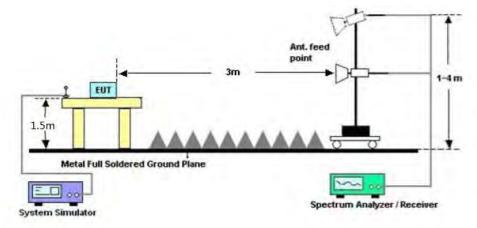
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



10.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/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

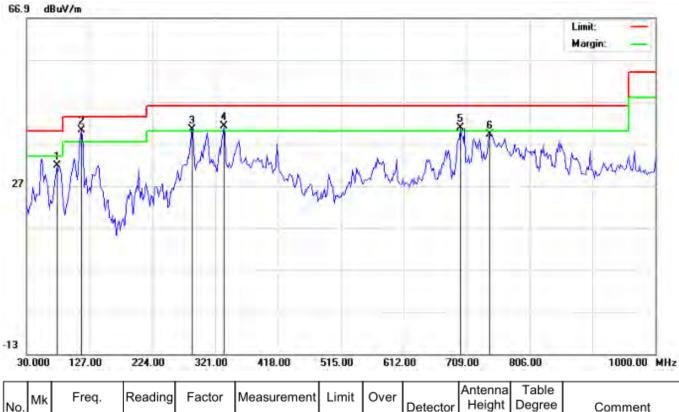
10.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

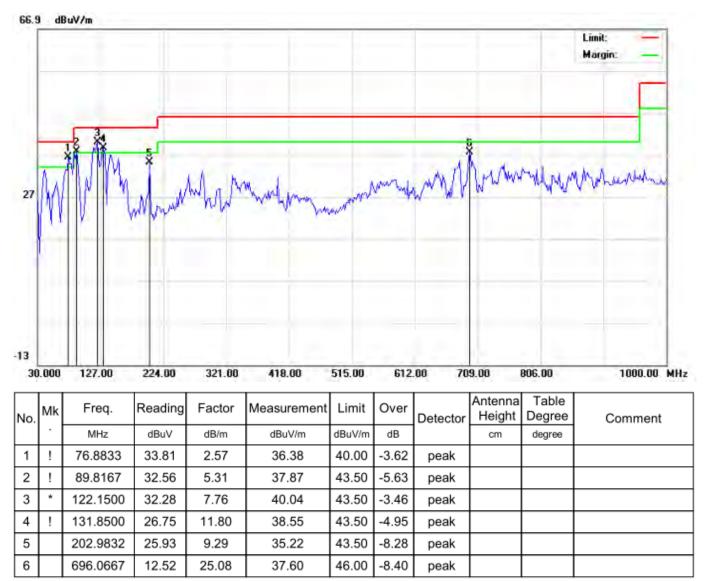
RADIATED EMISSION BELOW 1GHZ

RADIATED EMISSION TEST- (30MHZ-1GHZ) -HORIZONTAL



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	·	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		76.8833	28.20	3.54	31.74	40.00	-8.26	peak			
2	*	114.0667	32.88	7.23	40.11	43.50	-3.39	peak			
3	!	285.4333	27.46	12.93	40.39	46.00	-5.61	peak			
4	!	333.9333	23.55	17.67	41.22	46.00	-4.78	peak			
5	!	699.3000	15.73	25.17	40.90	46.00	-5.10	peak			
6		744.5667	12.72	26.47	39.19	46.00	-6.81	peak			

RESULT: PASS



RADIATED EMISSION TEST- (30MHZ-1GHZ) -VERTICAL

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

3. All test modes for different EUT are pre-tested. The low channel for GFSK mode is the worst case and recorded in the report.

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	Comment		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	Comment		
	Low Channel (2402 MHz)								
4804	63.79	-3.62	60.17	74	-13.83	Pk	Vertical		
4804	43.82	-3.62	40.20	54	-13.80	AV	Vertical		
4804	62.65	-3.64	59.01	74	-14.99	Pk	Horizontal		
4804	45.54	-3.64	41.90	54	-12.10	AV	Horizontal		
			Mid Channel (2441	MHz)					
4882	63.84	-3.65	60.19	74	-13.81	Pk	Vertical		
4882	43.69	-3.65	40.04	54	-13.96	AV	Vertical		
4882	62.37	-3.68	58.69	74	-15.31	Pk	Horizontal		
4882	42.65	-3.68	38.97	54	-15.03	AV	Horizontal		
	High Channel (2480 MHz)								
4960	63.68	-3.59	60.09	74	-13.91	pk	Vertical		
4960	44.15	-3.59	40.56	54	-13.44	AV	Vertical		
4960	63.00	-3.59	59.41	74	-14.59	pk	Horizontal		
4960	42.33	-3.59	38.74	54	-15.26	AV	Horizontal		

RADIATED EMISSION TEST- (ABOVE 1GHZ)

Note:

1) 30MHz~25GHz:(Scan with GFSK, π/4-DQPSK,8DPSK, the worst casw is GFSK Mode)

2) Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Meter Reading + Factor Margin = Emission Leve - Limit

RESULT: PASS

11. BAND EDGE EMISSION

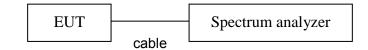
11.1. MEASUREMENT PROCEDURE

- 1. The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100kHz. The video bandwidth is set to 300kHz.
- 2. Transmitter set to the normal hopping mode at 2.4 and 2.4835 GHz.

11.2. TEST SET-UP

Radiated same as 10.2

Conducted set up



Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	Comment	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
GFSK								
2399.9	62.50	-12.99	49.51	74	-24.49	peak	Vertical	
2399.9	53.79	-12.99	40.80	54	-13.20	AVG	Vertical	
2399.9	66.45	-12.99	53.46	74	-20.54	peak	Horizontal	
2399.9	53.54	-12.99	40.55	54	-13.45	AVG	Horizontal	
2483.6	61.89	-12.78	49.11	74	-24.89	peak	Vertical	
2483.6	51.68	-12.78	38.90	54	-15.10	AVG	Vertical	
2483.6	63.59	-12.78	50.81	74	-23.19	peak	Horizontal	
2483.6	53.41	-12.78	40.63	54	-13.37	AVG	Horizontal	
			π/4-D	QPSK				
2399.9	63.60	-12.99	50.61	74	-23.39	peak	Vertical	
2399.9	53.94	-12.99	40.95	54	-13.05	AVG	Vertical	
2399.9	63.77	-12.99	50.78	74	-23.22	peak	Horizontal	
2399.9	53.63	-12.99	40.64	54	-13.36	AVG	Horizontal	
2483.6	62.53	-12.78	49.75	74	-24.25	peak	Vertical	
2483.6	51.33	-12.78	38.55	54	-15.45	AVG	Vertical	
2483.6	61.19	-12.78	48.41	74	-25.59	peak	Horizontal	
2483.6	50.63	-12.78	37.85	54	-16.15	AVG	Horizontal	
			8DF	PSK				
2399.9	63.14	-12.99	50.15	74	-23.85	peak	Vertical	
2399.9	55.30	-12.99	42.31	54	-11.69	AVG	Vertical	
2399.9	64.37	-12.99	51.38	74	-22.62	peak	Horizontal	
2399.9	50.52	-12.99	37.53	54	-16.47	AVG	Horizontal	
2483.6	61.34	-12.78	48.56	74	-25.44	peak	Vertical	
2483.6	53.41	-12.78	40.63	54	-13.37	AVG	Vertical	
2483.6	62.42	-12.78	49.64	74	-24.36	peak	Horizontal	
2483.6	56.45	-12.78	43.67	54	-10.33	AVG	Horizontal	

11.3. Radiated TEST RESULT

RESULT: PASS

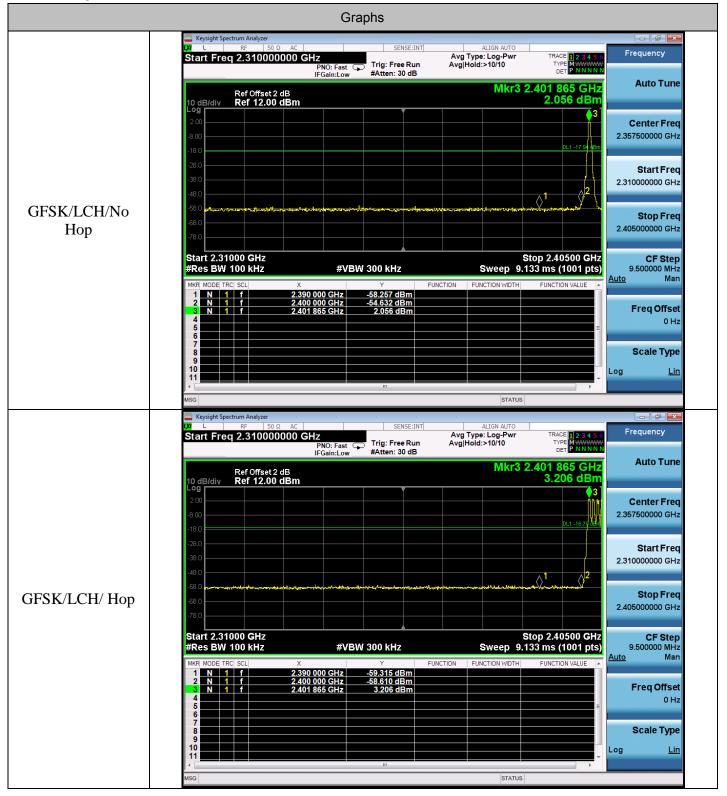
Note: The other modes radiation emission have enough 20dB margin.

Factor=Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

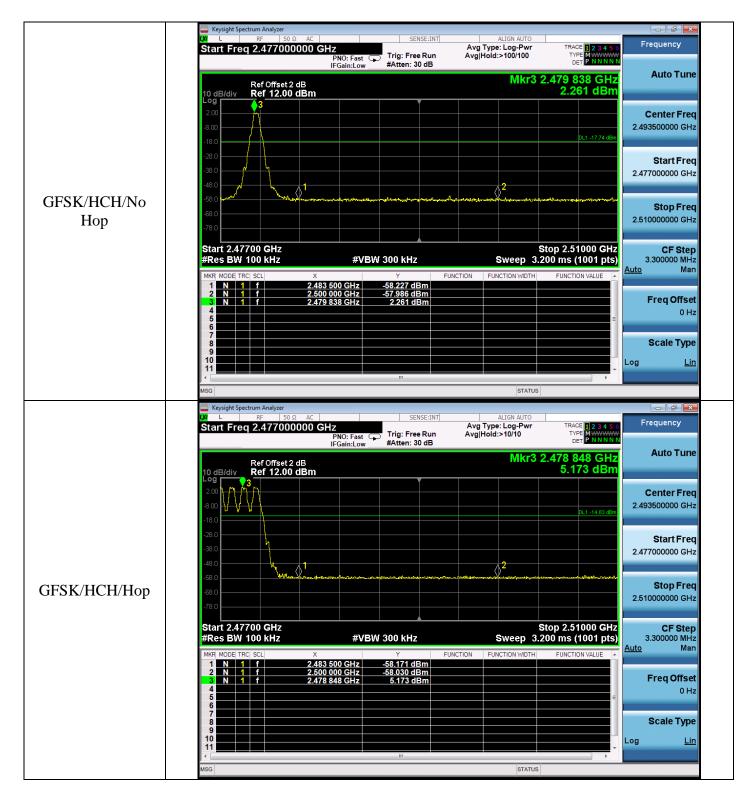
The "Factor" value can be calculated automatically by software of measurement system.

11.4 Conducted TEST RESULT

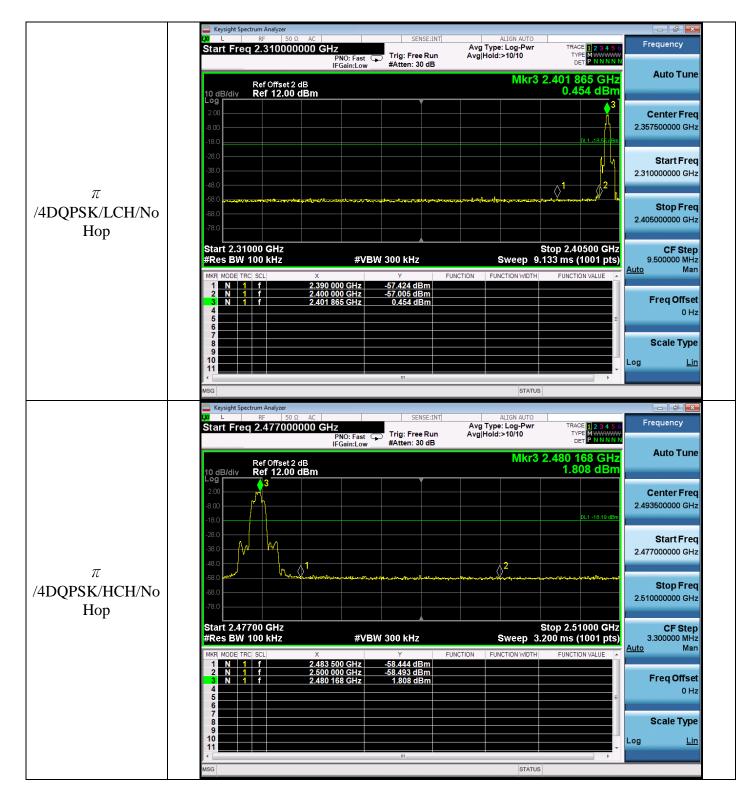
Test Graph



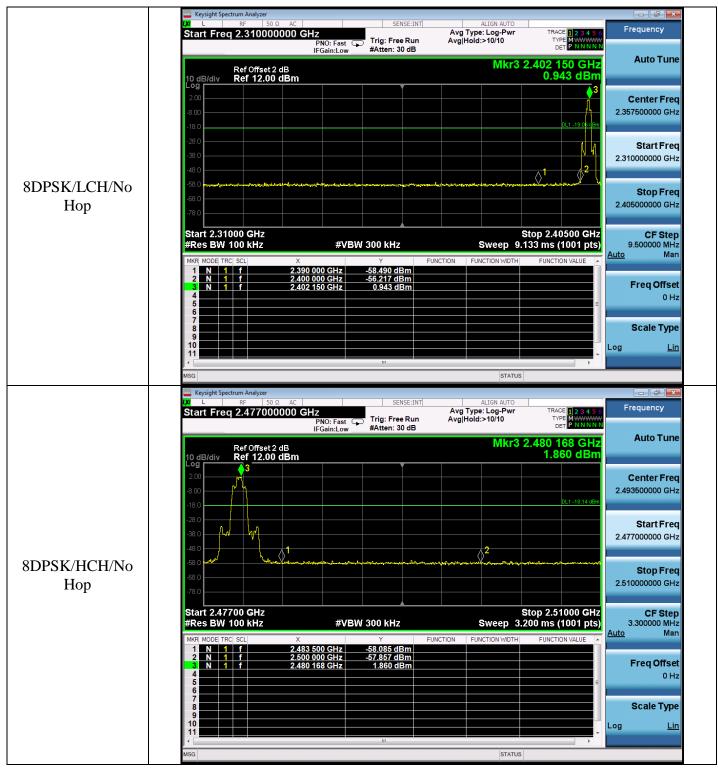
Report No.: AGC10576170701FE03 Page 34 of 46



Report No.: AGC10576170701FE03 Page 35 of 46



Report No.: AGC10576170701FE03 Page 36 of 46



Note: All modes were tested, only the worst case record in the report.

12. NUMBER OF HOPPING FREQUENCY

12.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer Start = 2.4GHz Stop = 2.4835GHz
- 4. Set the Spectrum Analyzer as RBW>=1%span, VBW>=RBW.

12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

12.3. MEASUREMENT EQUIPMENT USED

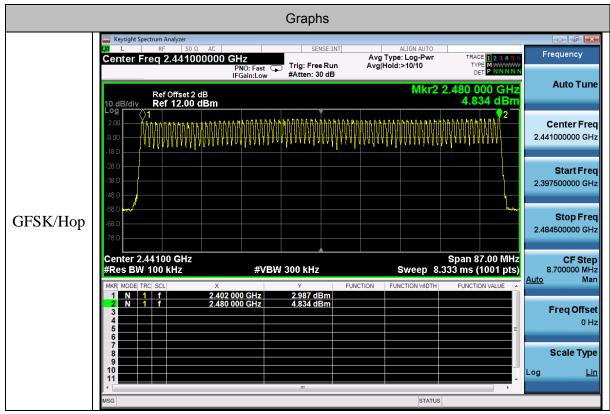
The same as described in section 6

12.4. LIMITS AND MEASUREMENT RESULT

Mode	Channel.	Number of Hopping Channel	Verdict
GFSK	Нор	79	PASS

Note: All modes were tested, only the worst case record in the report.

Test Graph



13. TIME OF OCCUPANCY (DWELL TIME)

13.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Zero span, centered on a hopping channel.

2. RBW shall be \leq channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.

3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.

4. Detector function: Peak. Trace: Max hold.

5. Use the marker-delta function to determine the transmit time per hop.

6. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time)

7. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

13.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

13.4. LIMITS AND MEASUREMENT RESULT

Channel.	Burst Width [ms/hop/ch]	Dwell Time[ms]	Verdict	Limit (ms)
LCH	3.085	329.067078	PASS	400
MCH	3.085	329.067078	PASS	400
HCH	3.085	329.067078	PASS	400

Note: The DH5 for GFSK modulation is the worst case and recorded in the report.

The dwell time is calculated with the following formula:

Dwell time = t_{pulse} x n_{hops} / number of channels x 31.6 s

Where:

t_{pulse} is the measured pulse time (pls. refer the plots of the spectrum analyser above) [s], n_{hops} is the number of hops per second in the actual operating mode of the transmitter [1/s].

The hopping rate of the system is 1600 hops per second and the system uses 79 channels. For this reason one time slot has a length of 625 $\mu s.$

With the used hopping mode (DH5) a packet need 5 timeslots for transmitting and the next timeslot for receiving. So the system makes in worst case 266,67 hops per second in transmit mode (n_{hops} = 266.667 1/s)

GFSK-MCH GFSK-LCH Avg Type: Log-P enter Freq 2.402000000 GH enter Freq 2.441000000 GHz Avg Type: Los Frequency Frequenc Trig: Free Run rig: Line Auto Tu Auto Tu Ref Offset 2 dB Ref 12.00 dBm Ref Offset 2 dB Ref 12.00 dBm Center Fre Center Fr X X2 24 2 441000 Stop Fr. Stop Fre 2.40 CF Ste CF St Freq Offs Freq Offs Scale Typ Scale Typ Li Span 0 Hz (1001 pts 100 C Span 0 Hz p 5.000 ms (1001 pts) 2.441000000 GHz 1 es B #VBW 3.0 MH

GF	SK-HCH	
Keysight Section Analyzer L 0P 150 2 AC Inter Freq 2.4800000000 GHz PNO: Fast Trig: Fre Atter: 3 AC	O dB DET	
Ref Offset 2 dB dB/div Ref 12.00 dBm	ΔMkr1 3.085 ms -0.21 dB	e
	1Δ2 * Center Fin 2.480000000 Gi	
	Start Fr 2.48000000 G	
9 9	Stop Fr 2.48000000 G	
njalaniiyiamani	1,00000 M	
	Freq Offs 01	
	Scale Typ	
enter 2.480000000 GHz es BW 1.0 MHz #VBW 3.0 MHz	Span 0 Hz Sweep 5.000 ms (1001 pts)	
10.	STATUS	

Test Graph

14. FREQUENCY SEPARATION

14.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
- Set Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span Video (or Average) Bandwidth (VBW) ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold

14.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 6.2

14.3. MEASUREMENT EQUIPMENT USED

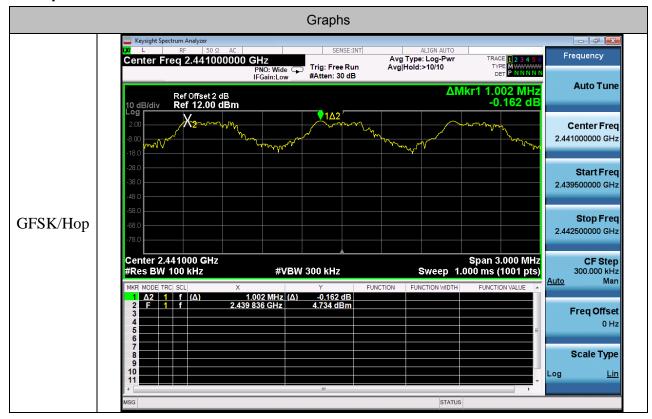
The same as described in section 6.3

14.4. LIMITS AND MEASUREMENT RESULT

Mode	Channel.	Carrier Frequency Separation [MHz]	Verdict
GFSK	Нор	1.002	PASS

Note: All modes were tested, only the worst case record in the report.

Test Graph



15. FCC LINE CONDUCTED EMISSION TEST

15.1. LIMITS OF LINE CONDUCTED EMISSION TEST

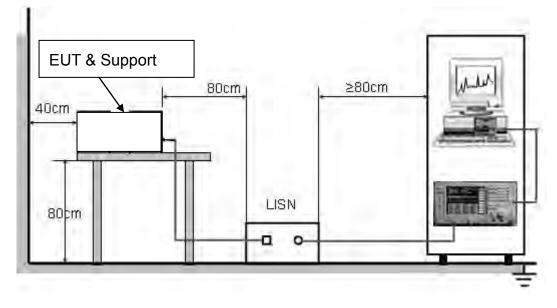
Frequency	Maximum RF Line Voltage							
Frequency	Q.P.(dBuV)	Average(dBuV)						
150kHz~500kHz	66-56	56-46						
500kHz~5MHz	56	46						
5MHz~30MHz	60	50						

Note:

1. The lower limit shall apply at the transition frequency.

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

15.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



15.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

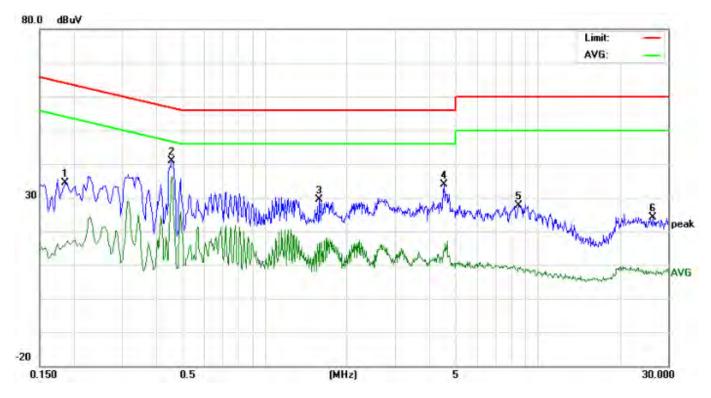
- The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipments received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received DC charging voltage by adapter which received 120V/60Hzpower by a LISN..
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

15.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

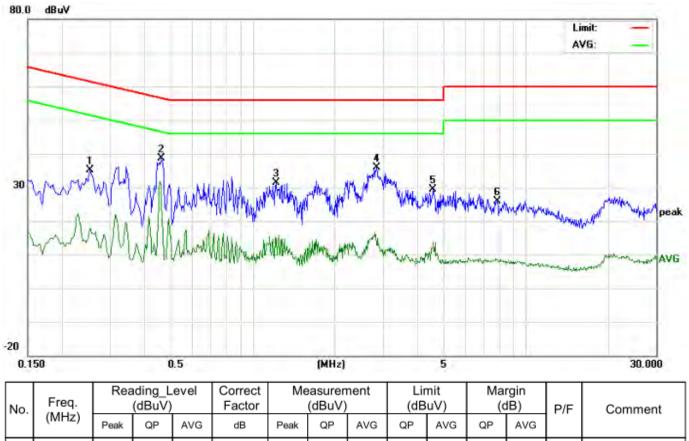
- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.

15.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST



Line Conducted Emission Test Line 1-L

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1874	23.72		6.28	10.20	33.92		16.48	64.15	54.15	-30.23	-37.67	Р	
2	0.4580	30.54		26.07	10.37	40.91		36.44	56.73	46.73	-15.82	-10.29	Р	
3	1.5900	19.07		5.68	10.35	29.42		16.03	56.00	46.00	-26.58	-29.97	Р	
4	4.5458	23.68		4.48	10.21	33.89		14.69	56.00	46.00	-22.11	-31.31	Р	
5	8.5059	17.33		-1.12	10.34	27.67		9.22	60.00	50.00	-32.33	-40.78	Р	
6	26.3099	14.08		-2.32	10.11	24.19		7.79	60.00	50.00	-35.81	-42.21	Р	



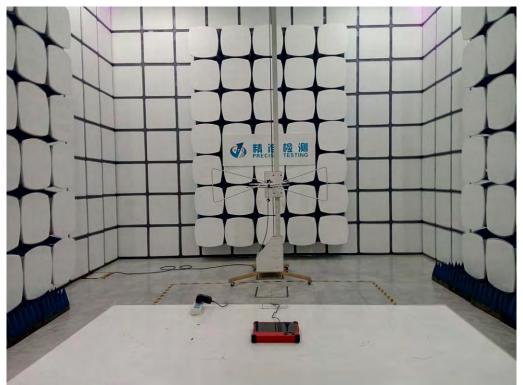
Line Conducted Emission Test Line 2-N

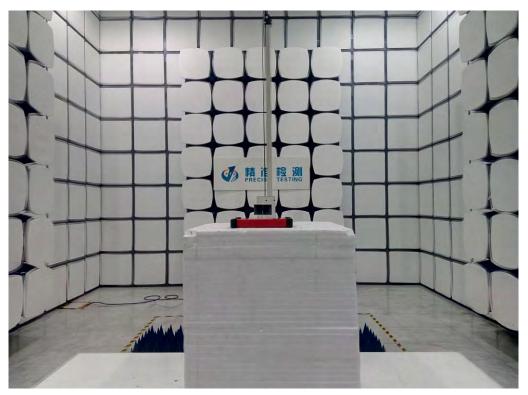
No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2540	24.77		7.56	10.27	35.04		17.83	61.62	51.62	-26.58	-33.79	Р	
2	0.4620	28.33		20.17	10.37	38.70		30.54	56.66	46.66	-17.96	-16.12	Р	
3	1.2179	20.88		4.60	10.37	31.25		14.97	56.00	46.00	-24.75	-31.03	Р	
4	2.8540	25.33		2.29	10.51	35.84		12.80	56.00	46.00	-20.16	-33.20	Р	
5	4.5858	19.06		3.69	10.22	29.28		13.91	56.00	46.00	-26.72	-32.09	Р	
6	7.8619	15.66		-1.61	10.34	26.00		8.73	60.00	50.00	-34.00	-41.27	Р	

APPENDIX A: PHOTOGRAPHS OF TEST SETUP FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP





----END OF REPORT----