

Report No.: SZEM160100046802

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### **FCC REPORT**

**Application No:** SZEM1601000468RG

Applicant: Hisense International Co., Ltd.

Manufacturer: Hisense Communications Co., Ltd.

Factory: Hisense Communications Co., Ltd.

Product Name: Mobile Phone Model No.(EUT): Hisense L675

Trade Mark: Hisense 2ADOBL675

Standards: 47 CFR Part 15, Subpart C (2015)

 Date of Receipt:
 2016-01-29

 Date of Test:
 2016-02-04

 Date of Issue:
 2016-02-23

Test Result: PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

#### Authorized Signature:



Jack Zhang EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.



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### 2 Version

Revision Record							
Version Chapter Date Modifier Remark							
00		2016-02-23		Original			

Authorized for issue by:		
Tested By	Benson Wong / Project Engineer	2016-02-04
	(Benson Wang) /Project Engineer	Date
Prepared By	Joyce Shi (Joyce Shi)/Clerk	2016-02-23  Date
Checked By	Eric Fu	2016-02-23
	(Eric Fu) /Reviewer	Date



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### 3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 (2013)	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 (2013)	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(1)	ANSI C63.10 (2013)	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10 (2013)	PASS
Carrier Frequencies Separation	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10 (2013)	PASS
Hopping Channel Number	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10 (2013)	PASS
Dwell Time	47 CFR Part 15, Subpart C Section 15.247 (a)(1)	ANSI C63.10 (2013)	PASS
Pseudorandom Frequency Hopping Sequence	47 CFR Part 15, Subpart C Section 15.247(b)(4)&TCB Exclusion List (7 July 2002)	ANSI C63.10 (2013)	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 (2013)	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 (2013)	PASS
Radiated Spurious emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 (2013)	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 (2013)	PASS



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### 5 General Information

#### 5.1 Client Information

Applicant:	Hisense International Co., Ltd.				
Address of Applicant:	Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071, China				
Manufacturer:	Hisense Communications Co., Ltd.				
Address of Manufacturer:	218 Qianwangang Road, Qingdao Economic & Technological Development Zone, Qingdao				
Factory:	Hisense Communications Co., Ltd.				
Address of Factory:	218 Qianwangang Road, Qingdao Economic & Technological Development Zone, Qingdao				

### 5.2 General Description of EUT

Product Name:	Mobile Phone
Model No.:	Hisense L675
Trade Mark:	Hisense
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	BT 4.0 dual mode
	This report is for classic mode.
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Sample Type:	Portable product
Test Software of EUT:	L675-userdebug 6.0 MRA58K L1224.6.01.01 release-keys
Antenna Type:	PIFA
Antenna Gain:	0.7dBi
Battery:	Lithium-ion battery:3.8V(charge by adapter)

#### Remark:

Model No.: Hisense L675

There are two kinds of color in this model, Only the sample in section 7 was tested, since the circuit design, PCB layout, electrical components used, internal wiring and functions were identical for the above samples, only different on colors.

And the accessories have different colors as below for marketing purpose.

Accessories	Model No	Color
Earphone	NLD-EM116T-50SH/ NLD-EM116T-40SH	white and black
Data cable	GEM1-2828L08WHR/ GEM1-2828L08BKR	white and black
Adaptor	A31-501000	white and black



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

#### Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency		
The Lowest channel	2402MHz		
The Middle channel	2441MHz		
The Highest channel	2480MHz		



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### 5.3 Test Environment

Operating Environment:				
Temperature:	25.0 °C			
Humidity:	53 % RH			
Atmospheric Pressure:	1020mbar			

### 5.4 Description of Support Units

The EUT has been tested independent unit.

### 5.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.



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### 5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### · CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

#### A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

#### VCCI

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

#### FCC – Registration No.: 556682

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

### Industry Canada (IC)

The 3m Semi-anechoic chambers and the 10m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-2, 4620C-3.

### 5.7 Deviation from Standards

None.

#### 5.8 Abnormalities from Standard Conditions

None.

### 5.9 Other Information Requested by the Customer

None.



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### 5.10 Equipment List

	Conducted Emission							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)		
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2015-05-13	2016-05-13		
2	LISN	Rohde & Schwarz	ENV216	SEL0152	2015-10-09	2016-10-09		
3	LISN	ETS-LINDGREN	3816/2	SEL0021	2015-05-13	2016-05-13		
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLIS N-T8-02	SEL0162	2015-08-30	2016-08-30		
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLIS N-T4-02	SEL0163	2015-08-30	2016-08-30		
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLIS N-T2-02	SEL0164	2015-08-30	2016-08-30		
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2015-05-13	2016-05-13		
8	Coaxial Cable	SGS	N/A	SEL0025	2015-05-13	2016-05-13		
9	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-09	2016-10-09		
10	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2015-10-24	2016-10-24		
11	Barometer	Chang Chun	DYM3	SEL0088	2015-05-13	2016-05-13		



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	RE in Chamber							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)		
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2015-05-13	2016-05-13		
2	EMI Test Receiver	Agilent Technologies	N9038A	SEL0312	2015-09-16	2016-09-16		
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A		
4	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2014-11-15	2017-11-15		
5	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2015-10-17	2016-10-17		
6	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2014-11-24	2017-11-24		
7	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2015-05-13	2016-05-13		
8	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2015-10-17	2016-10-17		
9	Coaxial cable	SGS	N/A	SEL0027	2015-05-13	2016-05-13		
10	Coaxial cable	SGS	N/A	SEL0189	2015-05-13	2016-05-13		
11	Coaxial cable	SGS	N/A	SEL0121	2015-05-13	2016-05-13		
12	Coaxial cable	SGS	N/A	SEL0178	2015-05-13	2016-05-13		
13	Band filter	Amindeon	82346	SEL0094	2015-05-13	2016-05-13		
14	Barometer	Chang Chun	DYM3	SEL0088	2015-05-13	2016-05-13		
15	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-09	2016-10-09		
16	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2015-10-24	2016-10-24		
17	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2015-05-13	2016-05-13		
18	Loop Antenna	Beijing Daze	ZN30401	SEL0203	2015-05-13	2016-05-13		



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	RF connected test						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)	
1	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-09	2016-10-09	
2	Humidity/ Temperature Indicator	HYGRO	ZJ1-2B	SEL0033	2015-10-24	2016-10-24	
3	Spectrum Analyzer	Rohde & Schwarz	FSP	SEL0154	2015-10-17	2016-10-17	
4	Coaxial cable	SGS	N/A	SEL0178	2015-05-13	2016-05-13	
5	Coaxial cable	SGS	N/A	SEL0179	2015-05-13	2016-05-13	
6	Barometer	ChangChun	DYM3	SEL0088	2015-05-13	2016-05-13	
7	Signal Generator	Rohde & Schwarz	SML03	SEL0068	2015-04-25	2016-04-25	
8	POWER METER	R & S	NRVS	SEL0144	2015-10-09	2016-10-09	
9	Attenuator	Beijin feihang taida	TST-2-6dB	SEL0205	2015-04-25	2016-04-25	



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### 6 Test results and Measurement Data

### 6.1 Antenna Requirement

**Standard requirement:** 47 CFR Part 15C Section 15.203 /247(c)

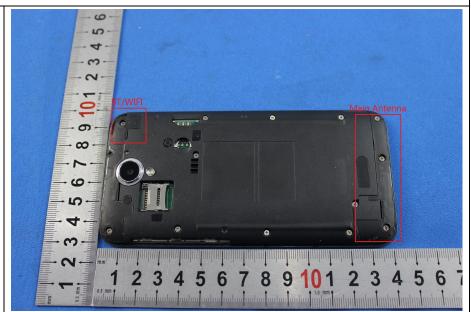
15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **EUT Antenna:**



The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0.7dBi.





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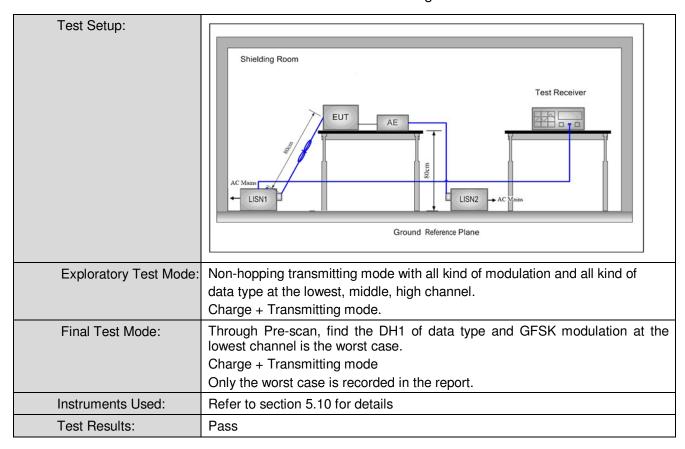
### 6.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207					
Test Method:	ANSI C63.10: 2013					
Test Frequency Range:	150kHz to 30MHz					
Limit:	Francisco (MIII-)	Limit (dBuV)				
	Frequency range (MHz)	Quasi-peak	Average			
	0.15-0.5	66 to 56*	56 to 46*			
	0.5-5	56	46			
	5-30	60	50			
	* Decreases with the logarithn	n of the frequency.		-		
Test Procedure:	The mains terminal disturb room.	bance voltage test was	s conducted in a shi	elded		
	,					



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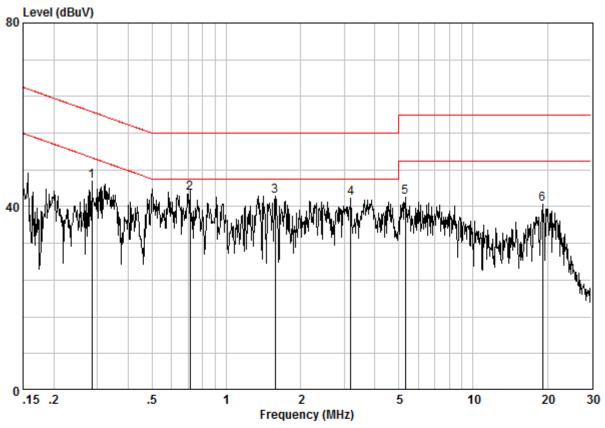
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#### **Measurement Data**

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line:



Site : Shielding Room Condition : CE LINE Job No. : 0468RG Test Mode : Charge+TX

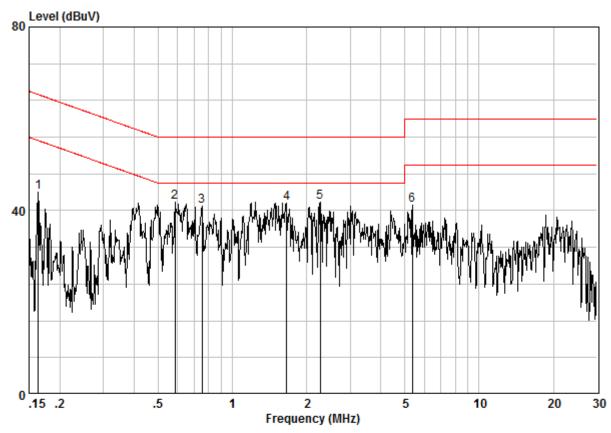
		Freq		LISN Factor			Limit Line	Over Limit	Remark
		MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	@	0.28478	0.01	9.59	35.93	45.53	50.68	-5.14	Peak
2	@	0.71219	0.02	9.61	33.21	42.84	46.00	-3.16	Peak
3	@	1.577	0.02	9.59	32.67	42.28	46.00	-3.72	Peak
4	@	3.190	0.02	9.62	32.19	41.83	46.00	-4.17	Peak
5		5.305	0.01	9.66	32.38	42.05	50.00	-7.95	Peak
6		19.122	0.02	9.78	30.76	40.56	50.00	-9.44	Peak



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#### Neutral line:



Site : Shielding Room Condition : CE NEUTRAL Job No. : 0468RG Test Mode : Charge+TX

		Freq		LISN Factor					Remark
		MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1		0.16327	0.02	9.61	34.40	44.03	55.30	-11.27	Peak
2	@	0.58540	0.01	9.63	32.17	41.82	46.00	-4.18	Peak
3	@	0.75493	0.02	9.64	31.33	40.99	46.00	-5.01	Peak
4	@	1.662	0.02	9.65	31.94	41.61	46.00	-4.39	Peak
5	@	2.273	0.02	9.67	32.12	41.81	46.00	-4.19	Peak
6		5.362	0.01	9.72	31.50	41.24	50.00	-8.76	Peak

#### Notes:

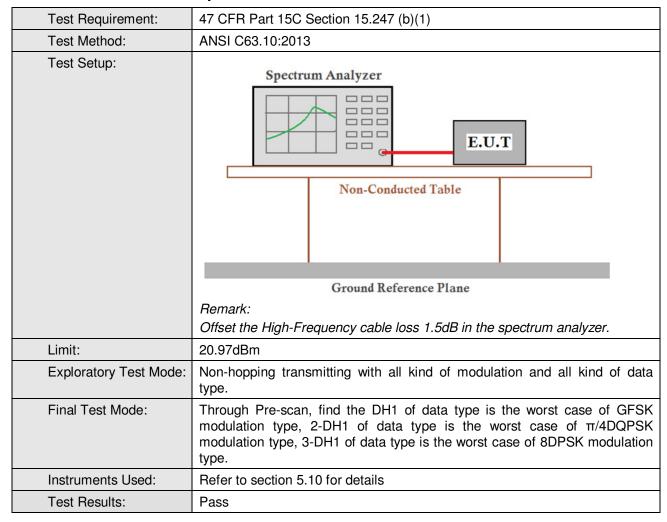
- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.



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### **6.3** Conducted Peak Output Power





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#### **Measurement Data**

vieasurement Data							
GFSK mode							
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result				
Lowest	5.27	20.97	Pass				
Middle	5.89	20.97	Pass				
Highest	5.47	20.97	Pass				
	π/4DQPSK m	ode					
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result				
Lowest	4.37	20.97	Pass				
Middle	Middle 5.06		Pass				
Highest	Highest 4.69		Pass				
	8DPSK mode						
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result				
Lowest	4.61	20.97	Pass				
Middle	5.19	20.97	Pass				
Highest	4.93	20.97	Pass				

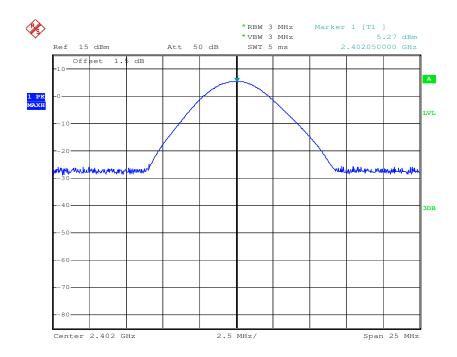


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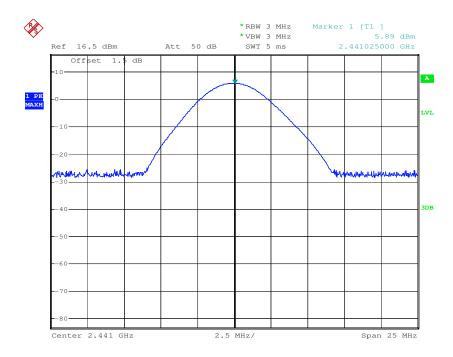
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### Test plot as follows:

Test mode: GFSK Test channel: Lowest





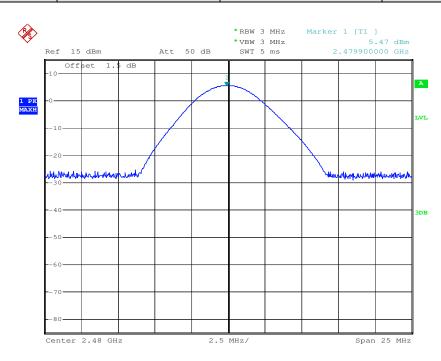




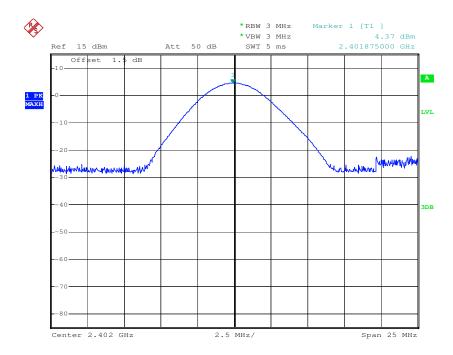
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Test mode: GFSK Test channel: Highest





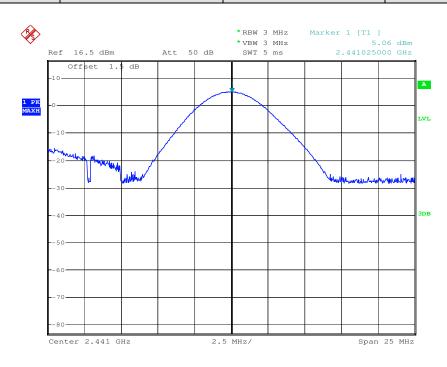




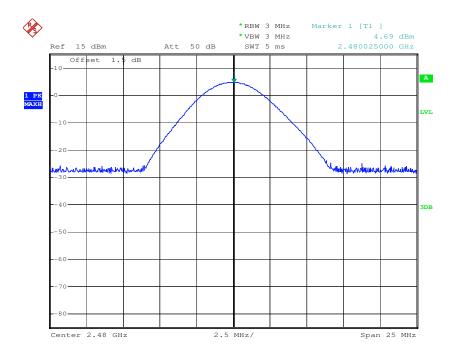
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Test mode: π/4DQPSK Test channel: Middle





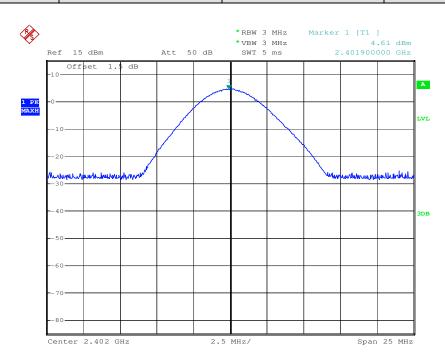




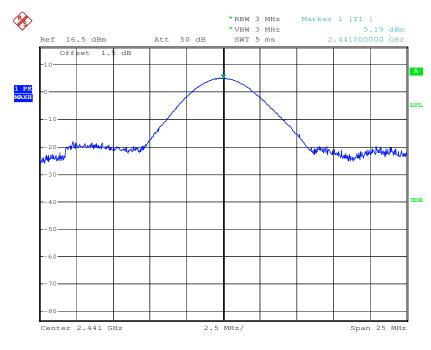
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Test mode: 8DPSK Test channel: Lowest







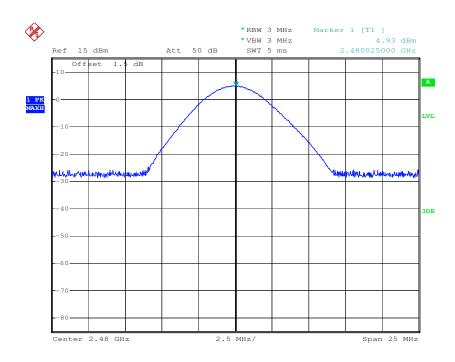




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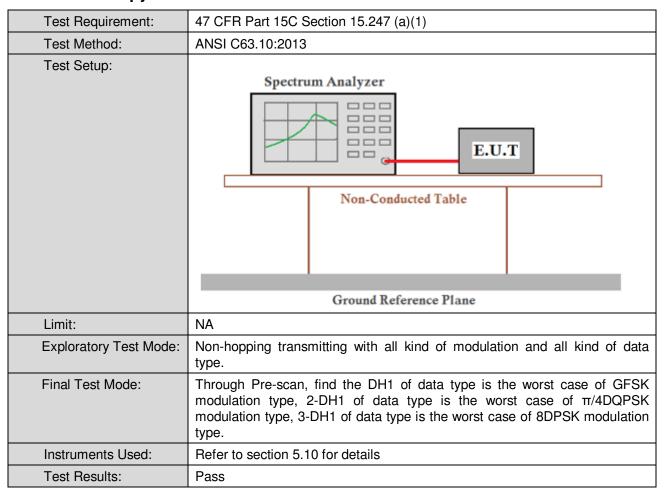




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### 6.4 20dB Occupy Bandwidth



#### **Measurement Data**

Toot channel	20dB Occupy Bandwidth (kHz)				
Test channel	GFSK	π/4DQPSK	8DPSK		
Lowest	939	1257	1269		
Middle	933	1260	1275		
Highest	897	1257	1272		

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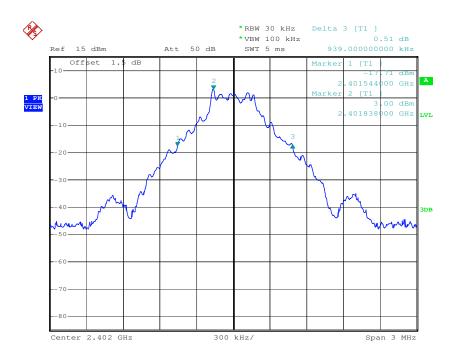


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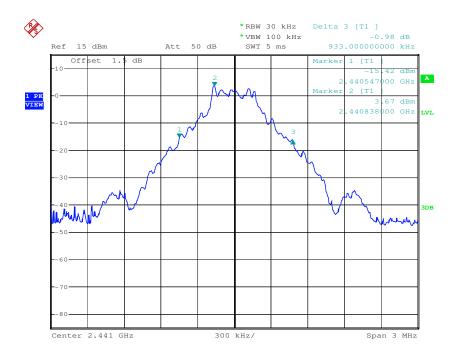
Page: 25 of 86

### Test plot as follows:

Test mode: GFSK Test channel: Lowest





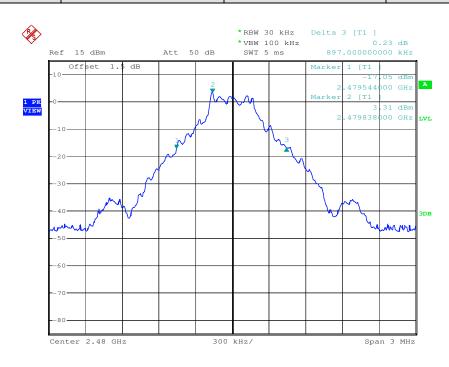




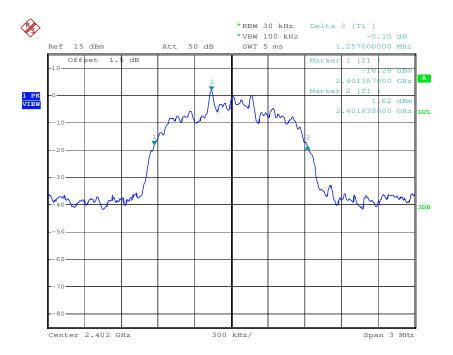
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Test mode: GFSK Test channel: Highest





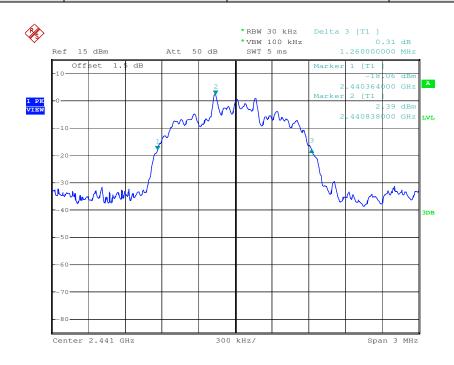




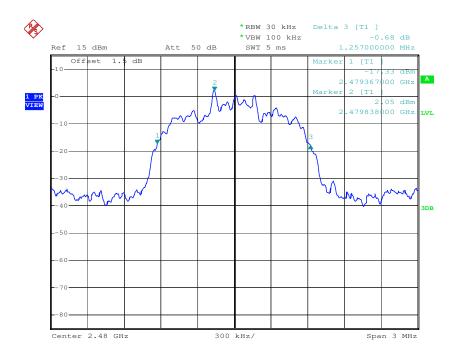
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Test mode: π/4DQPSK Test channel: Middle





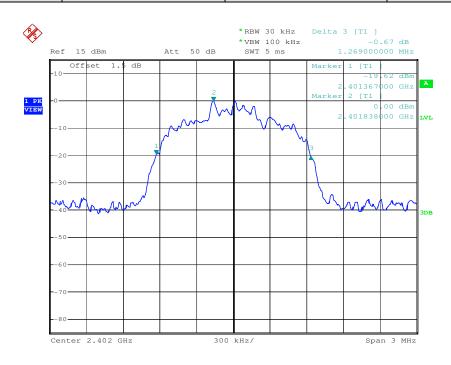




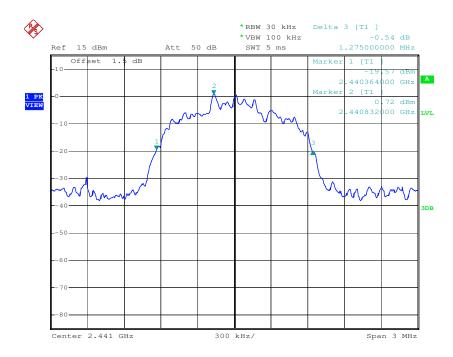
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Test mode: 8DPSK Test channel: Lowest





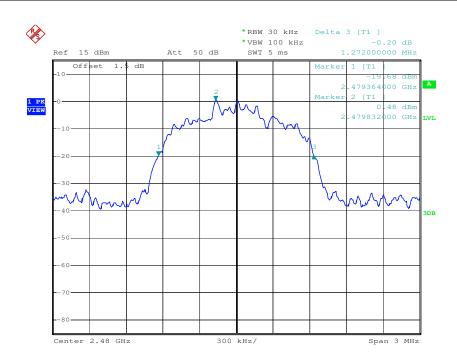




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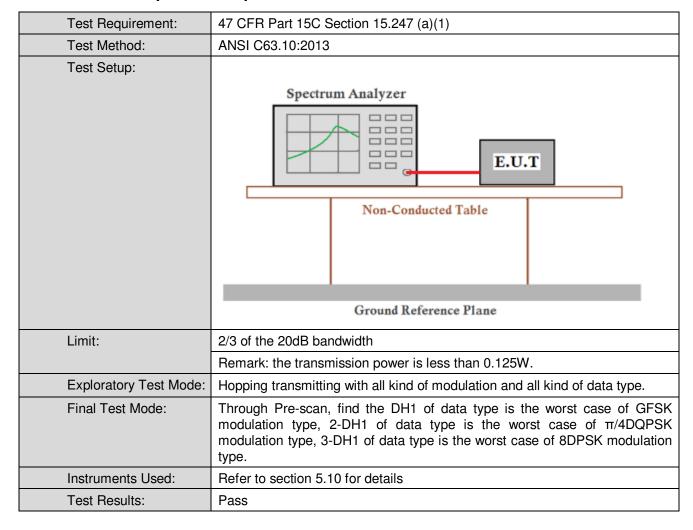




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### 6.5 Carrier Frequencies Separation





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#### **Measurement Data**

model of the first state							
GFSK mode							
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result				
Middle	945	≥626	Pass				
π/4DQPSK mode							
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result				
Middle	Middle 990		Pass				
8DPSK mode							
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result				
Middle 999		≥850	Pass				

Note: According to section 6.4,

Mode	20dB bandwidth (kHz)	Limit (kHz)	
	(worse case)	(Carrier Frequencies Separation)	
GFSK	939	626	
π/4DQPSK	1260	840	
8DPSK	1275	850	

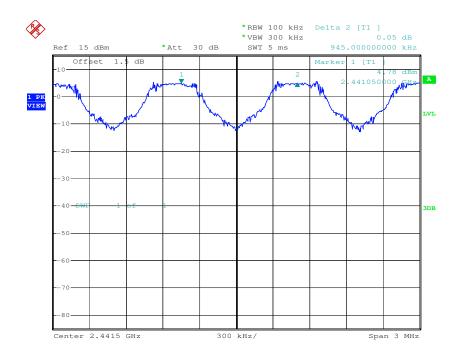


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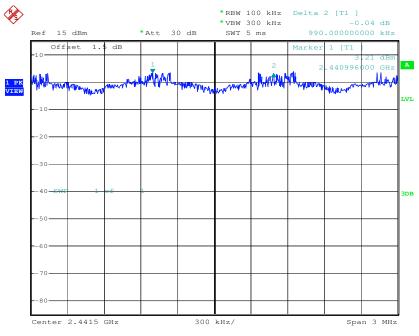
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Test plot as follows:

Test mode: GFSK Test channel: Middle



Test mode: π/4DQPSK Test channel: Middle



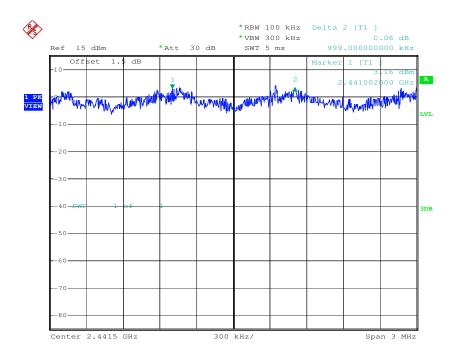




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Test mode: 8DPSK Test channel: Middle

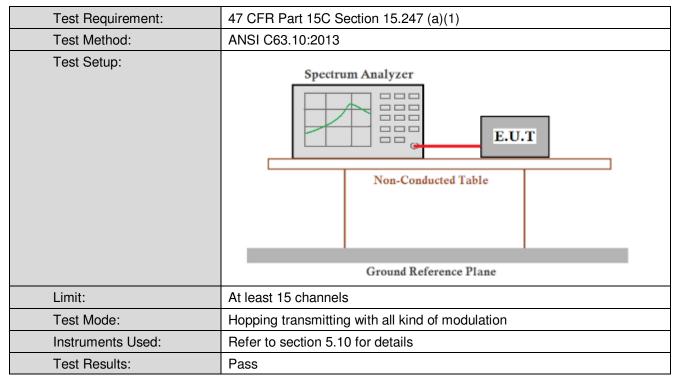




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### 6.6 Hopping Channel Number



#### **Measurement Data**

Mode	Hopping channel numbers	Limit
GFSK	79	≥15
π/4DQPSK	79	≥15
8DPSK	79	≥15

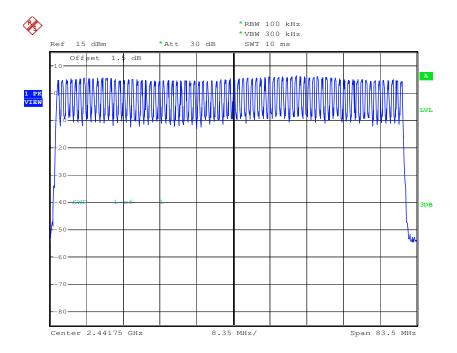


Report No.: SZEM160100046802

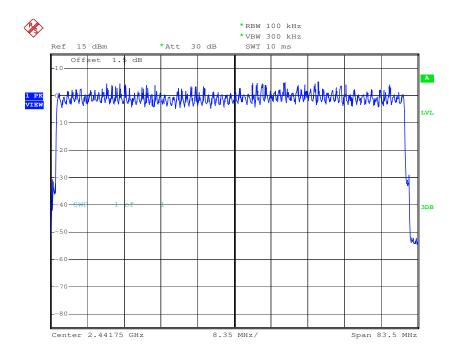
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### Test plot as follows:

Test mode: GFSK





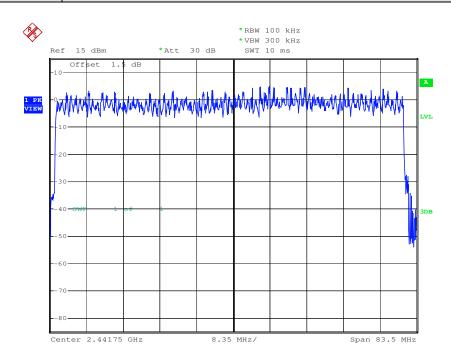




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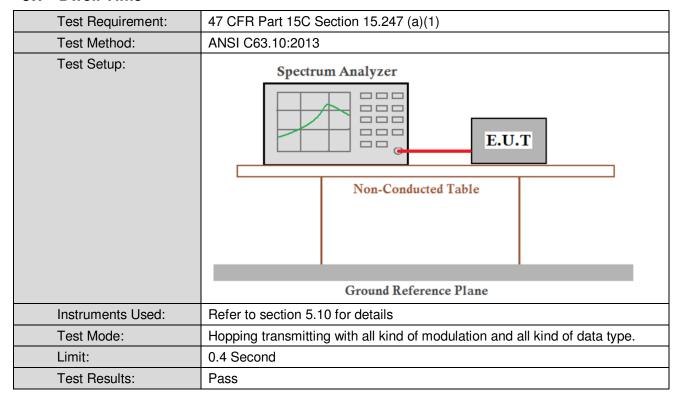




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#### 6.7 Dwell Time



#### **Measurement Data**

Mode	Packet	Dwell time (second)	Limit (second)	
GFSK	DH1	0.10	0.4	
	DH3	0.21	0.4	
	DH5	0.32	0.4	
π/4DQPSK	2-DH1	0.11	0.4	
	2-DH3	0.21	0.4	
	2-DH5	0.32	0.4	
8DPSK	3-DH1	0.11	0.4	
	3-DH3	0.21	0.4	
	3-DH5	0.18	0.4	

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#### Remark:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

On (ms)\*total number=dwell time (ms)

The middle channel (2441MHz), as below:

DH1 time slot=0.373 (ms)\*total number=104.44 (ms)

DH3 time slot=1.632 (ms)\* total number = 212.16 (ms)

DH5 time slot=2.880 (ms)\* total number = 316.80 (ms)

2-DH1 time slot=0.381 (ms)\*total number=106.68 (ms)

2-DH3 time slot=1.635 (ms)\* total number = 212.55 (ms)

2-DH5 time slot=2.884 (ms)\* total number = 317.24 (ms)

3-DH1 time slot=0.381 (ms)\*total number=106.68 (ms)

3-DH3 time slot=1.635 (ms)\* total number = 212.55 (ms)

3-DH5 time slot=1.660 (ms)\* total number = 182.60 (ms)

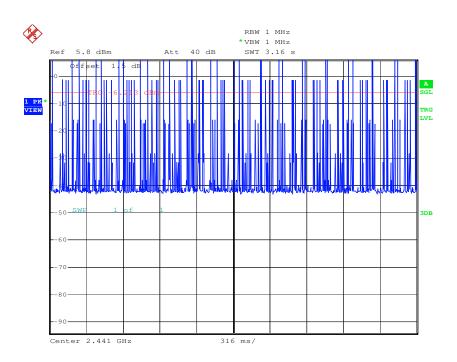


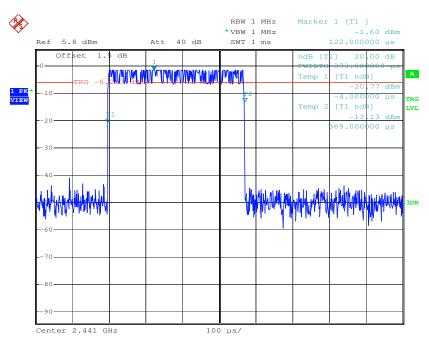
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#### Test plot as follows:

Test Packet:	DH1

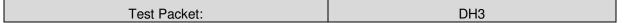


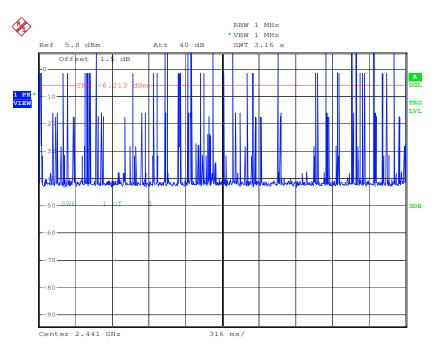


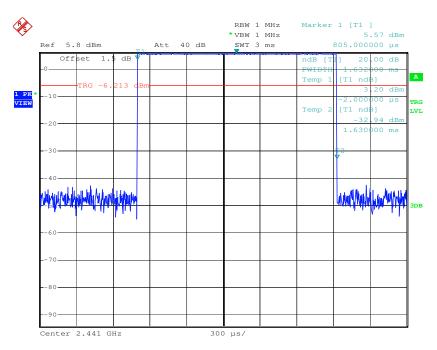


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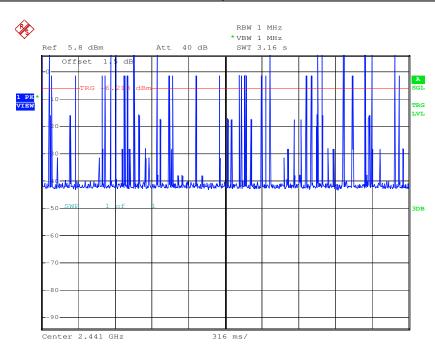


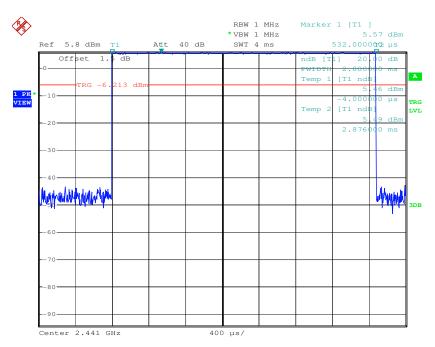


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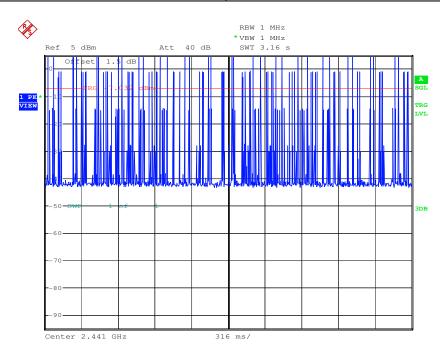
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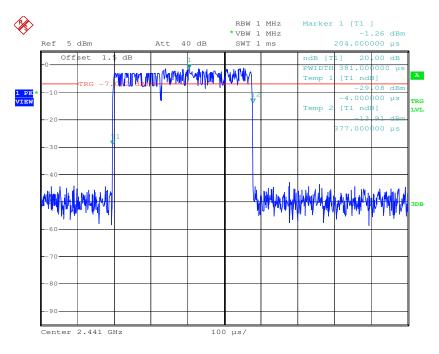


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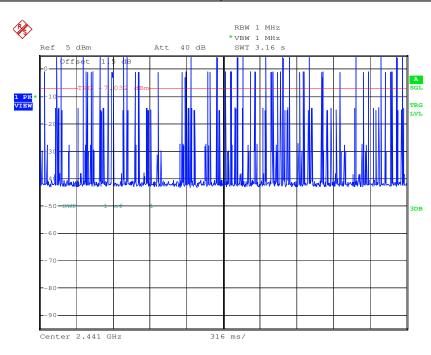


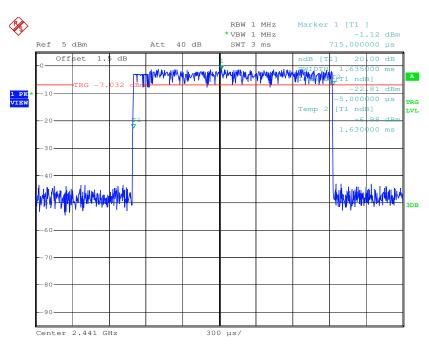


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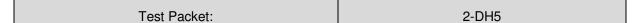


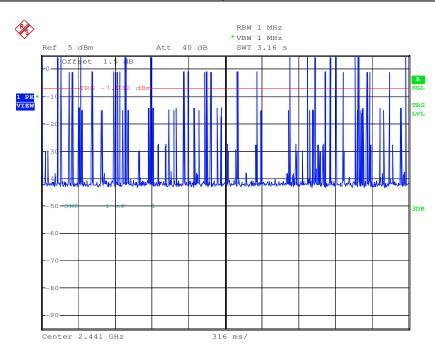


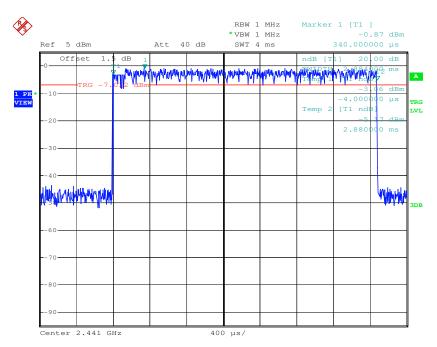


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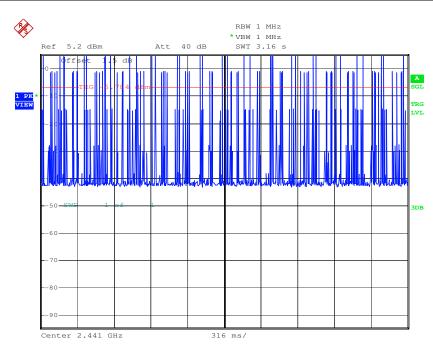


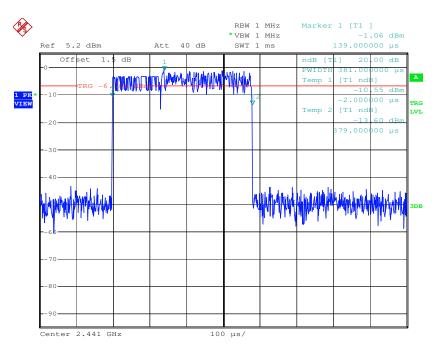


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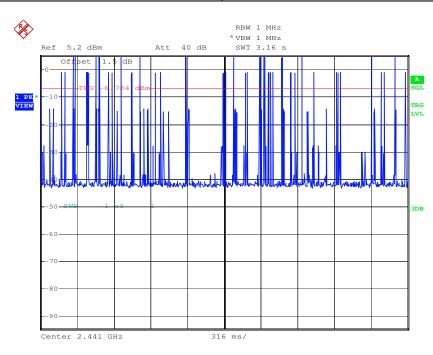


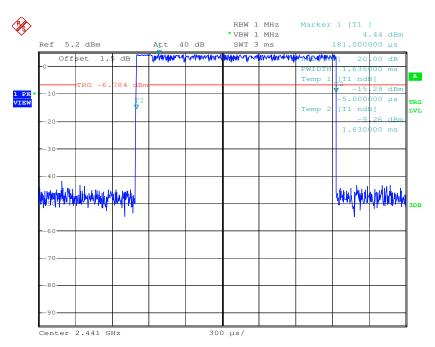


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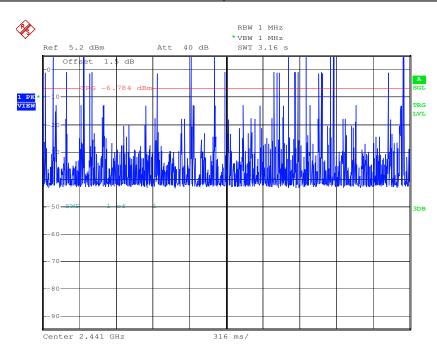


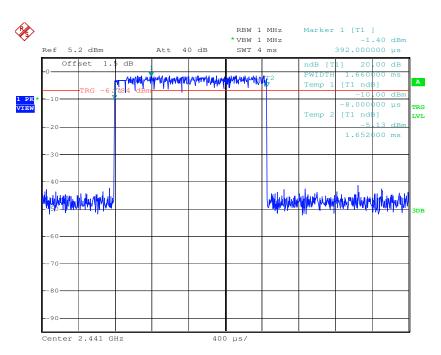


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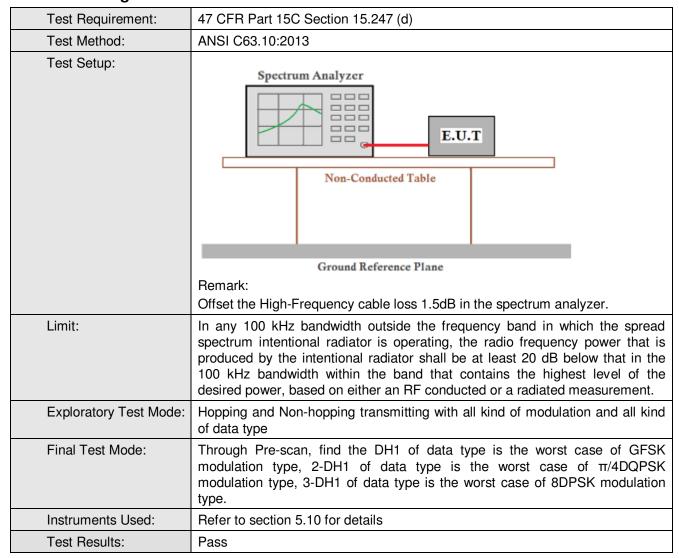




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#### 6.8 Band-edge for RF Conducted Emissions



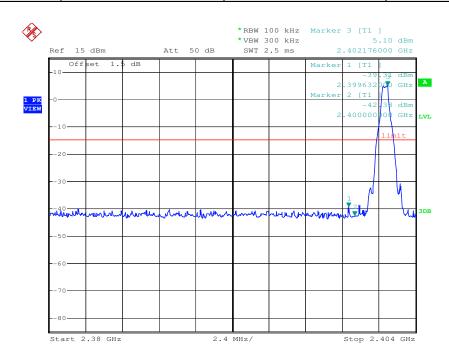


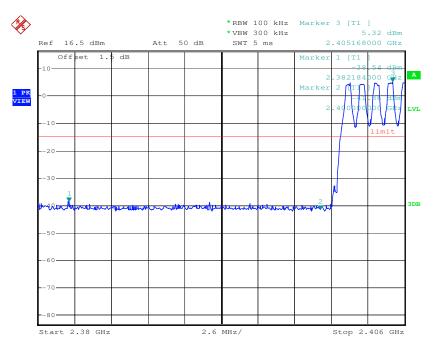
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#### Test plot as follows:

Test mode: GFSK Test channel: Lowest



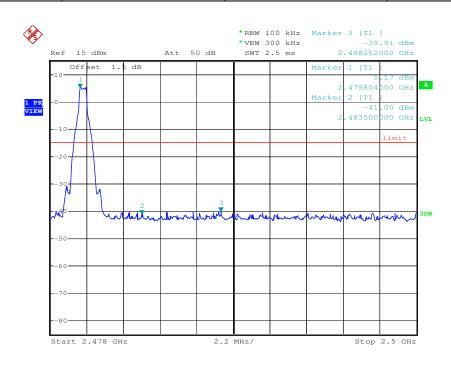


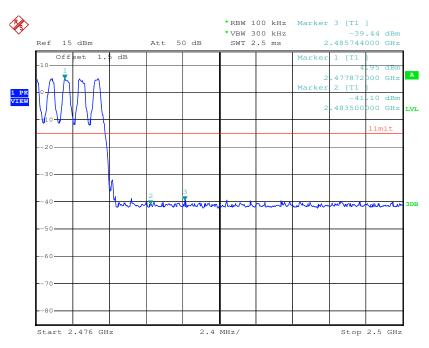


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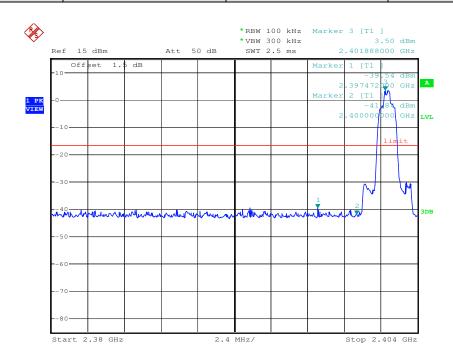


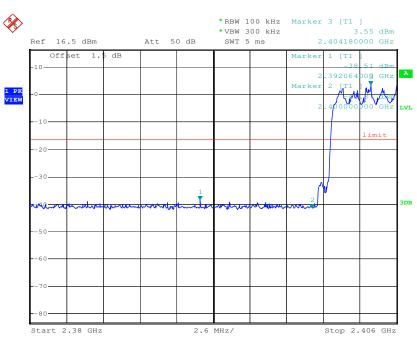


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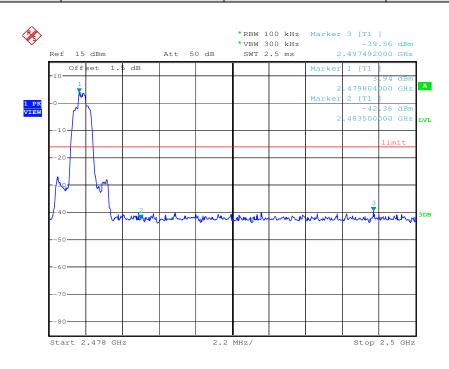


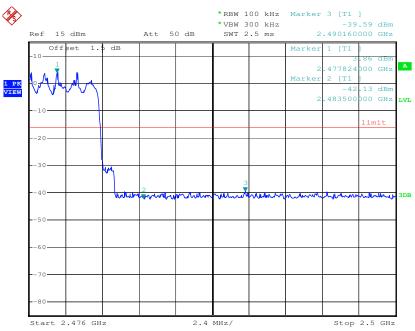


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Test mode: π/4DQPSK Test channel: Highest





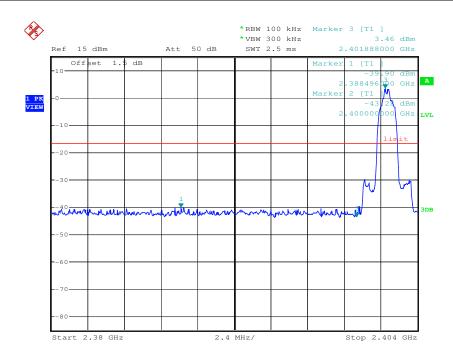


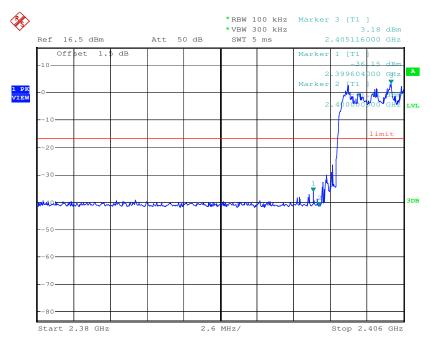


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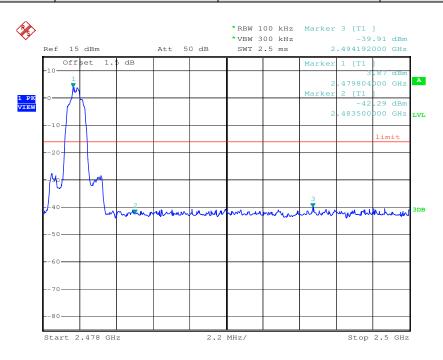


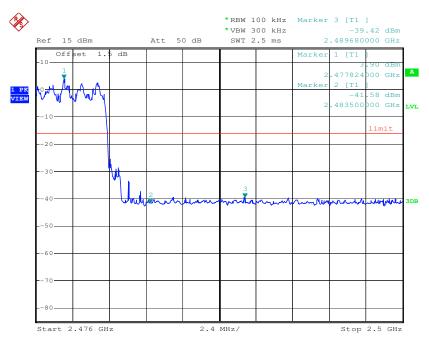


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#### 6.9 Spurious RF Conducted Emissions

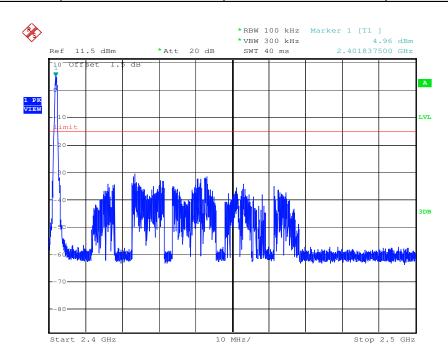
Test Requirement:	47 CFR Part 15C Section 15.247 (d)		
Test Method:	ANSI C63.10:2013		
Test Setup:	Spectrum Analyzer  F.U.T  Non-Conducted Table  Ground Reference Plane  Remark:  Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.		
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.		
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type.		
Final Test Mode:	Through Pre-scan, find the DH1 of data type is the worst case of GFSK modulation type, 2-DH1 of data type is the worst case of $\pi/4DQPSK$ modulation type, 3-DH1 of data type is the worst case of 8DPSK modulation type.		
Instruments Used:	Refer to section 5.10 for details		
Test Results:	Pass		

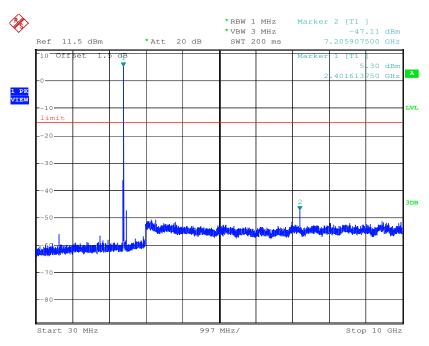


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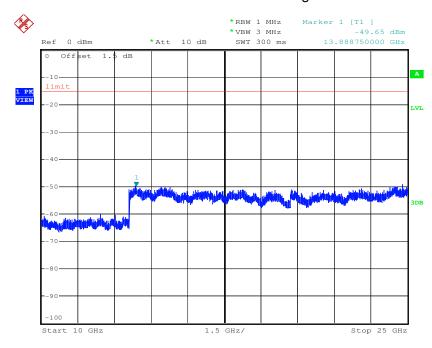


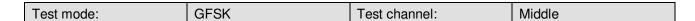


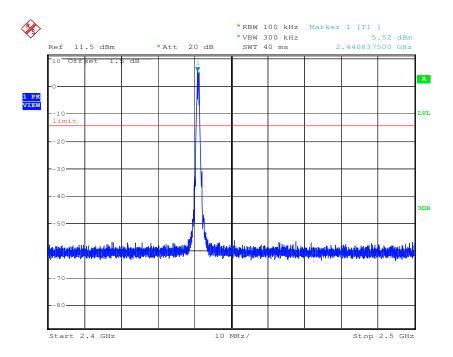


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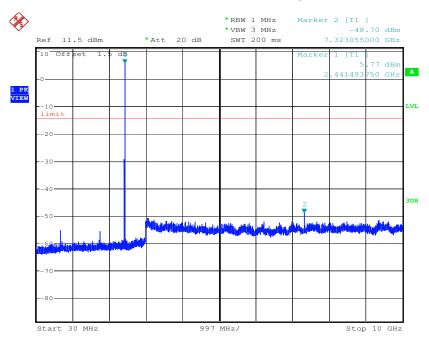


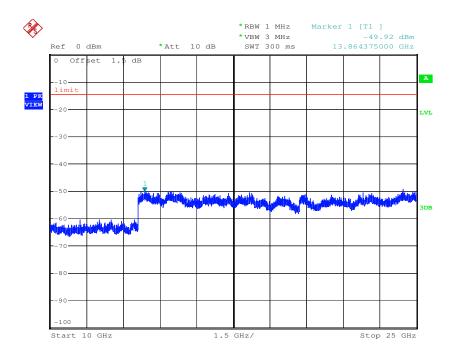




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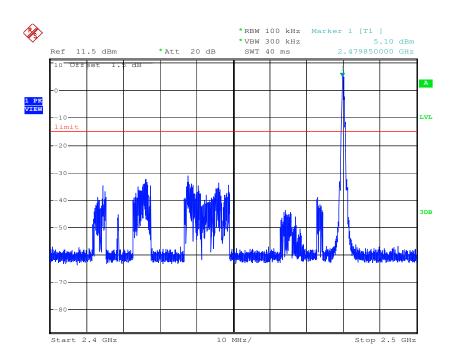


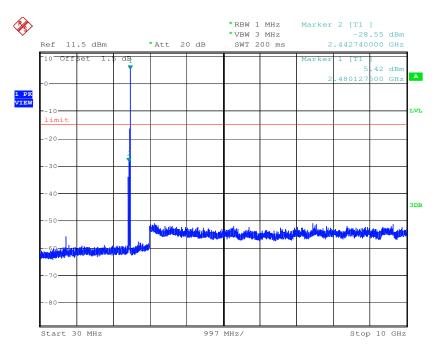


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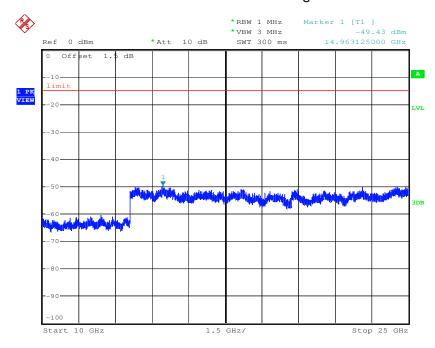




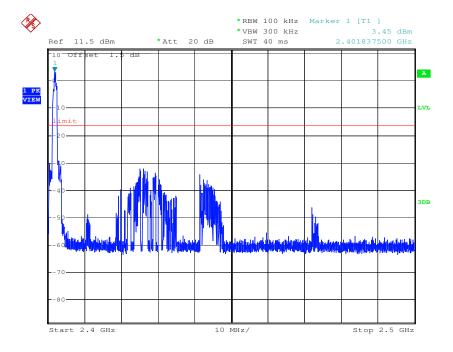


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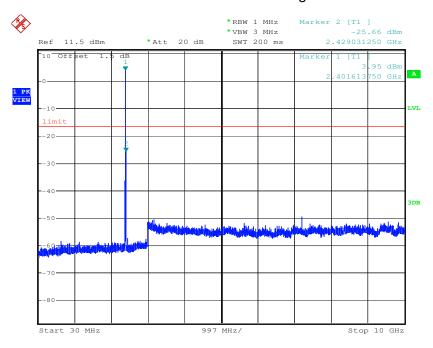


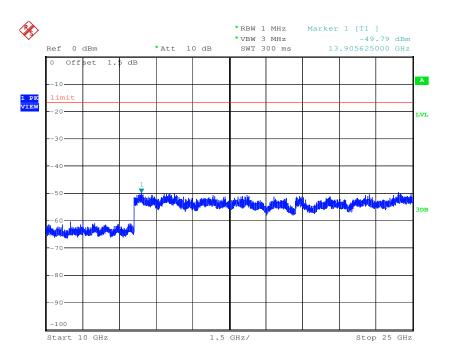




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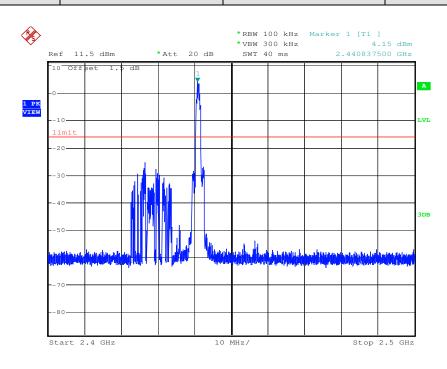


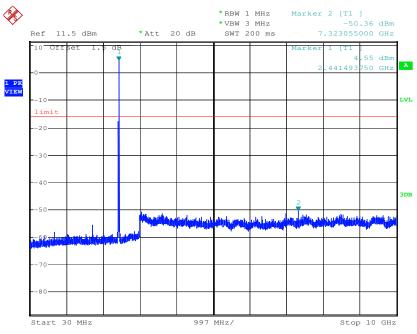


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Test mode: π/4DQPSK Test channel: Middle



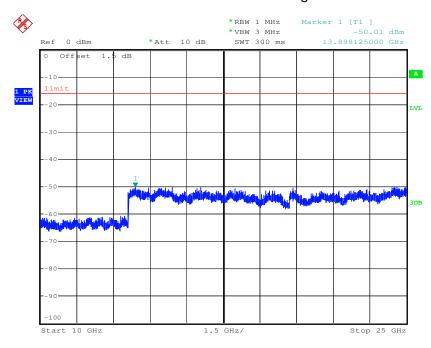




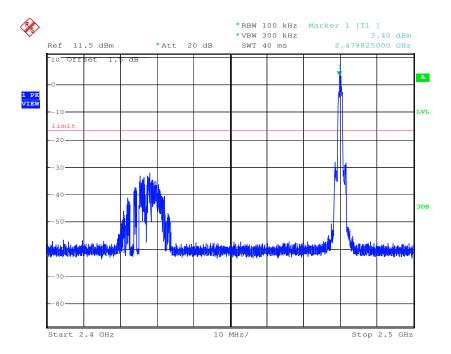


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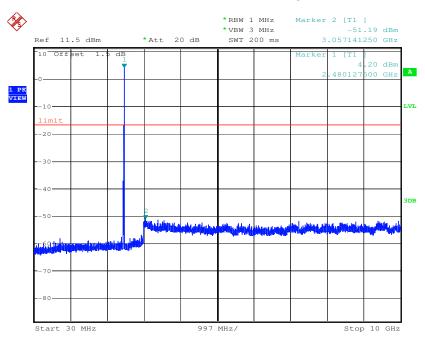


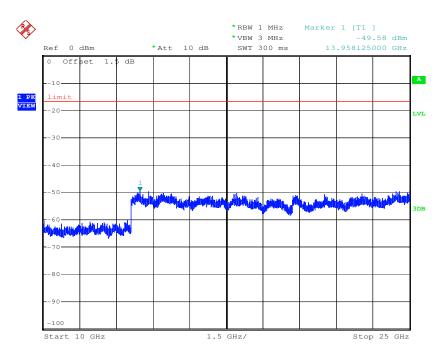




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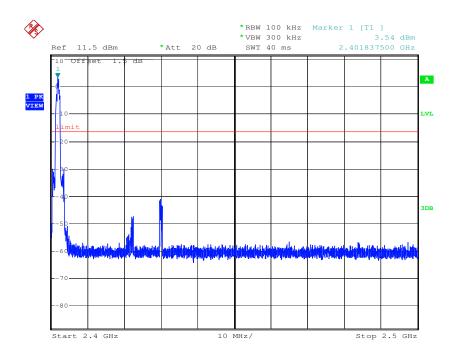


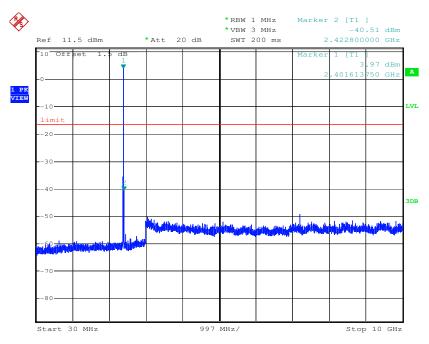


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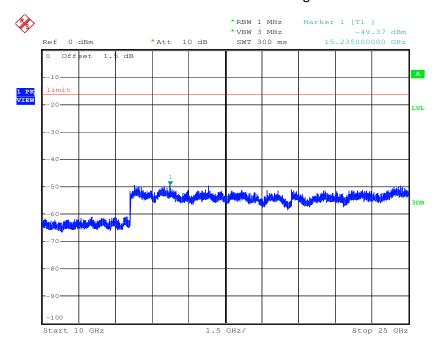




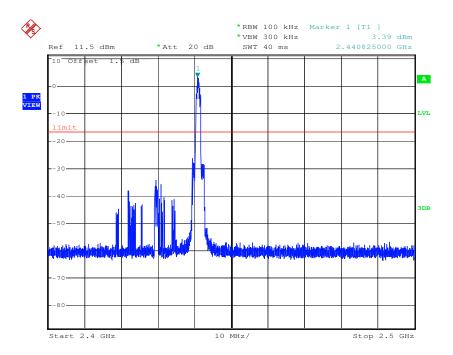


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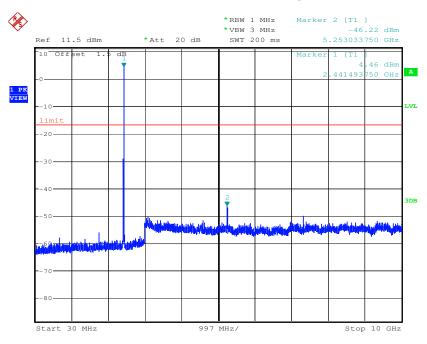


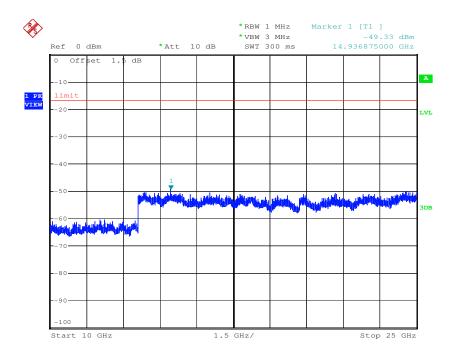




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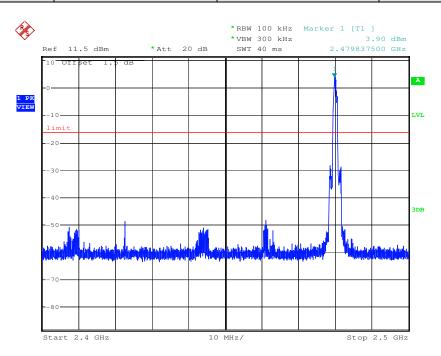


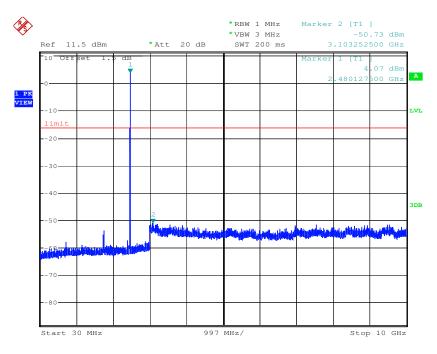


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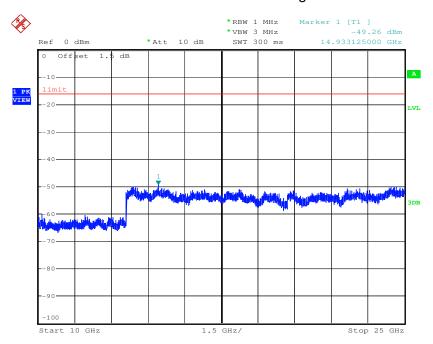






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#### Remark:

Use 100kHz RBW to determine the relative limit in the band 2.4GHz to 2.5GHz, and Use 1MHz RBW to measure spurious emissions in the band 30MHz to 10GHz and 10GHz to 25GHz. The sweep points set to 30001.



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#### 6.10 Other requirements Frequency Hopping Spread Spectrum System

#### Test Requirement: 47 CFR Part 15C Section 15.247 (a)(1), (h) requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

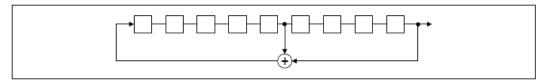
The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

#### Compliance for section 15.247(a)(1)

According to Bluetooth Core Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage

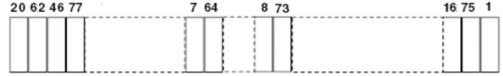
outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- · Number of shift register stages: 9
- Length of pseudo-random sequence:  $2^9 1 = 511$  bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

According to Bluetooth Core Specification, Bluetooth receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any Bluetooth transmitters and shift frequencies in synchronization with the transmitted signals.



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#### Compliance for section 15.247(g)

According to Bluetooth Core Specification, the Bluetooth system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

#### Compliance for section 15.247(h)

According to Bluetooth Core specification, the Bluetooth system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

According to the Bluetooth Core specification, the Bluetooth system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.



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#### 6.11 Radiated Spurious Emission

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205							
Test Method:	ANSI C63.10: 2013							
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)							
Receiver Setup:	Frequency 0.009MHz-0.090MHz		Detector	RBW	VBW	Remark		
			Peak	10kHz	z 30kHz	Peak		
	0.009MHz-0.090MH	Z	Average	10kHz	z 30kHz	Average		
	0.090MHz-0.110MHz		Quasi-peak	10kHz	z 30kHz	Quasi-peak		
	0.110MHz-0.490MHz		Peak	10kHz	z 30kHz	Peak		
	0.110MHz-0.490MHz		Average	10kHz	z 30kHz	Average		
	0.490MHz -30MHz		Quasi-peak	10kHz	z 30kHz	Quasi-peak		
	30MHz-1GHz		Quasi-peak	100 kH	lz 300kHz	Quasi-peak	к	
	Above 1GHz		Peak	1MHz	z 3MHz	Peak		
			Peak	1MHz	z 10Hz	Average		
Limit:	Frequency		eld strength crovolt/meter)	Limit (dBuV/m)	Remark	Measuremer distance (m		
	0.009MHz-0.490MHz	2	400/F(kHz)	-	-	300		
	0.490MHz-1.705MHz	24000/F(kHz)		-	-	30		
	1.705MHz-30MHz	30		-	-	30		
	30MHz-88MHz	100		40.0	Quasi-peak	3		
	88MHz-216MHz	150		43.5	Quasi-peak	3		
	216MHz-960MHz	200		46.0	Quasi-peak	3		
	960MHz-1GHz	500		54.0	Quasi-peak	3		
	Above 1GHz	500		54.0	Average	3		
	Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequen emissions is 20dB above the maximum permitted average emission I applicable to the equipment under test. This peak limit applies to the peak emission level radiated by the device.							

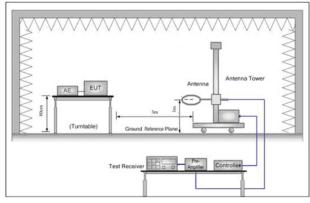




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#### Test Setup:



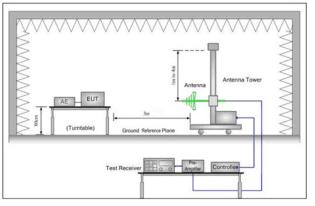


Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz

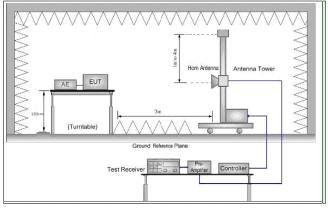


Figure 3. Above 1 GHz

#### Test Procedure:

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height 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.
- e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified



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Bandwidth with Maximum Hold Mode.					
<ul> <li>g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> <li>h. Test the EUT in the lowest channel (2402MHz),the middle channel (2441MHz),the Highest channel (2480MHz)</li> </ul>					
<ol> <li>The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</li> </ol>					
j. Repeat above procedures until all frequencies measured was complete.					
Non-hopping transmitting mode with all kind of modulation and all kind of					
data type					
Transmitting mode, Charge + Transmitting mode.					
Through Pre-scan, find the DH1 of data type and GFSK modulation is the worst case.					
Pretest the EUT at Transmitting mode and Charge + Transmitting mode, found the Charge + Transmitting mode which it is worse case					
For below 1GHz part, through pre-scan, the worst case is the lowest channel.					
Only the worst case is recorded in the report.					
Refer to section 5.10 for details					
Pass					



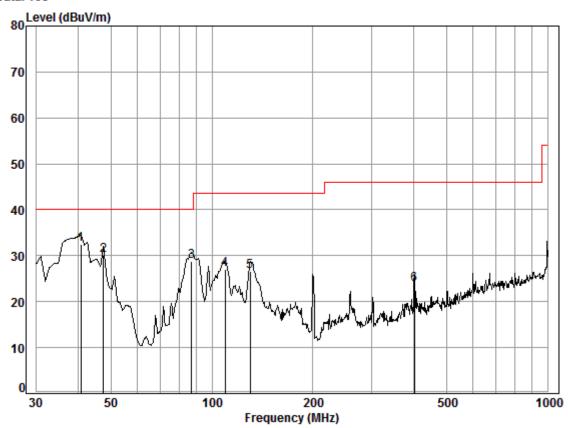
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#### 6.11.1 Radiated Emission below 1GHz

30MHz~1GHz (QP)		
Test mode:	Charge + Transmitting	Vertical





Condition: 3m VERTICAL

Job No. : 0468RG

Test mode: Charge+Tx Mode

	mouc. cm	u 6- 1	x nouc					
		Cable	Ant	Preamp	Read		Limit	0ver
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	d Bu V/m	dBuV/m	dB
1	40.70	0.62	12.86	27.32	46.41	32.57	40.00	-7.43
2	47.49	0.75	9.89	27.30	46.71	30.05	40.00	-9.95
3	87.11	1.10	8.52	27.22	46.30	28.70	40.00	-11.30
4	109.41	1.23	8.72	27.14	44.21	27.02	43.50	-16.48
5	129.92	1.28	7.90	27.01	44.51	26.68	43.50	-16.82
6	400.43	2.20	16.40	27.13	32.37	23.84	46.00	-22.16

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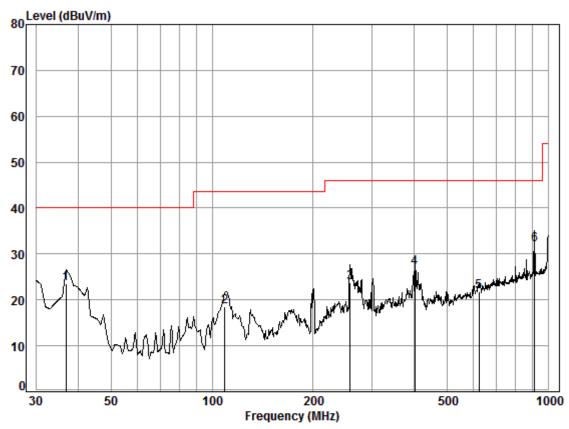


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Test mode: Charge + Transmitting Horizontal





Condition: 3m HORIZONTAL

Job No. : 0468RG

Test mode: Charge+Tx mode

		Cable	Ant	Preamp	Read		Limit	0ver
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	36.77	0.60	14.90	27.33	35.44	23.61	40.00	-16.39
2	109.03	1.23	8.74	27.14	35.65	18.48	43.50	-25.02
3	257.42	1.71	12.35	26.51	36.23	23.78	46.00	-22.22
4	400.43	2.20	16.40	27.13	35.65	27.12	46.00	-18.88
5	622.89	2.75	20.25	27.51	26.22	21.71	46.00	-24.29
6	909.67	3.61	23.28	26.71	31.89	32.07	46.00	-13.93

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#### 6.11.2 Transmitter Emission above 1GHz

Worse case	mode:	GFSK(DH	1) Tes	t channel:	Lowes	t	Remark:		Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)		Line V/m)	Over Limit (dB)	Polarization
3892.524	32.99	7.77	38.52	46.18	48.42	7	4	-25.58	Vertical
4804.000	34.10	8.87	38.75	46.38	50.60	74		-23.40	Vertical
6016.949	34.71	10.54	38.94	46.46	52.77	7	4	-21.23	Vertical
7206.000	35.60	10.68	37.64	41.34	49.98	7	4	-24.02	Vertical
9608.000	37.10	12.50	36.35	37.06	50.31	74		-23.69	Vertical
12621.510	37.91	14.50	37.77	37.88	52.52	74	4	-21.48	Vertical
3770.567	32.78	7.73	38.47	45.77	47.81	7	4	-26.19	Horizontal
4804.000	34.10	8.87	38.75	46.47	50.69	7	4	-23.31	Horizontal
5982.226	34.66	10.51	38.96	46.03	52.24	7	4	-21.76	Horizontal
7206.000	35.60	10.68	37.64	41.57	50.21	7	4	-23.79	Horizontal
9608.000	37.10	12.50	36.35	37.17	50.42	7	4	-23.58	Horizontal
12566.850	37.87	14.34	37.72	37.98	52.47	7	4	-21.53	Horizontal

Worse case	mode:	GFSK(DF	H1) To	est channel:	Middl	le	Remark:		Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line		Over Limit (dB)	Polarization
3770.567	32.78	7.73	38.47	46.10	48.14	74		-25.86	Vertical
4882.000	34.18	8.98	38.77	45.72	50.11	74		-23.89	Vertical
5982.226	34.66	10.51	38.96	46.04	52.25	74		-21.75	Vertical
7323.000	35.54	10.72	37.59	42.41	51.08	74		-22.92	Vertical
9764.000	37.10	12.58	36.14	38.12	51.66	74		-22.34	Vertical
12639.790	37.92	14.55	37.79	37.52	52.20	74		-21.80	Vertical
3759.672	32.74	7.73	38.47	45.62	47.62	74		-26.38	Horizontal
4882.000	34.18	8.98	38.77	46.40	50.79	74		-23.21	Horizontal
5930.516	34.53	10.37	38.95	46.26	52.21	74		-21.79	Horizontal
7323.000	35.54	10.72	37.59	42.85	51.52	74		-22.48	Horizontal
9764.000	37.10	12.58	36.14	38.10	51.64	74		-22.36	Horizontal
12566.850	37.87	14.34	37.72	37.72	52.21	74		-21.79	Horizontal



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Worse case	mode:	GFSK(DF	11)	Test channel:	Highe	est	Remark:		Peak
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Pream Factor (dB)		Level (dBuV/m)	Limit (dBu\		Over Limit (dB)	Polarization
3825.521	32.93	7.75	38.49	45.56	47.75	74	ļ	-26.25	Vertical
4960.000	34.26	9.09	38.78	46.03	50.60	74	ļ	-23.40	Vertical
5964.939	34.61	10.46	38.95	46.50	52.62	74	ļ	-21.38	Vertical
7440.000	35.60	10.77	37.54	39.63	48.46	74	ļ	-25.54	Vertical
9920.000	37.22	12.67	35.93	38.25	52.21	74		-21.79	Vertical
12603.270	37.90	14.44	37.75	37.11	51.70	74	ļ	-22.30	Vertical
3803.444	32.90	7.74	38.49	45.45	47.60	74	ļ	-26.40	Horizontal
4960.000	34.26	9.09	38.78	46.26	50.83	74	ļ	-23.17	Horizontal
5964.939	34.61	10.46	38.95	45.44	51.56	74	ļ	-22.44	Horizontal
7440.000	35.60	10.77	37.54	41.10	49.93	74	ļ	-24.07	Horizontal
9920.000	37.22	12.67	35.93	38.73	52.69	74		-21.31	Horizontal
12530.530	37.83	14.24	37.68	37.45	51.84	74		-22.16	Horizontal

#### Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
  - Final Test Level = Receiver Reading + Antenna Factor + Cable Factor Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

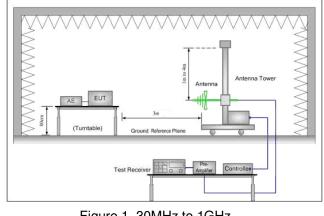


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### 6.12 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 1	5.209 and 15.205						
Test Method:	ANSI C63.10: 2013							
Test Site:	Measurement Distance: 3m	(Semi-Anechoic Chambe	r)					
Limit:	Frequency	Limit (dBuV/m @3m)	Remark					
	30MHz-88MHz	40.0	Quasi-peak Value					
	88MHz-216MHz	43.5	Quasi-peak Value					
	216MHz-960MHz	46.0	Quasi-peak Value					
	960MHz-1GHz	54.0	Quasi-peak Value					
	Above 1CUz	54.0	Average Value					
	Above 1GHz	74.0	Peak Value					
Test Setup:								



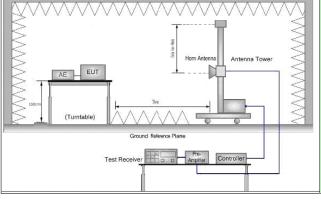


Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz

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Test Procedure:	<ul> <li>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>b. For above 1GHz, the EUT was placed on the top of a rotating table</li> </ul>
	1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
	c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
	d. The antenna height 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.
	e. 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.
	f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel
	<ul> <li>h. Test the EUT in the lowest channel, the Highest channel</li> <li>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</li> </ul>
	<ul> <li>Repeat above procedures until all frequencies measured was complete.</li> </ul>
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type  Transmitting mode, Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case.
	Pretest the EUT at Transmitting mode and Charge + Transmitting mode, found the Charge + Transmitting mode which it is worse case
	Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

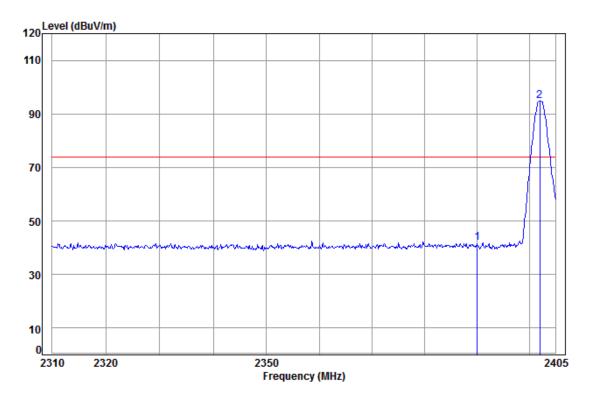


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Test plot as follows:

Worse case mode: GFSK (DH5) Test channel: Lowest Remark: Peak Vertical



Condition: 3m Vertical Job No: : 0616CR

Mode: : 2402 Band edge

: BT

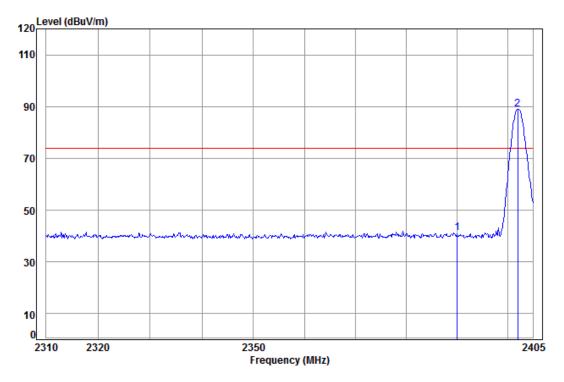
Cable Ant Preamp Read Limit 0ver Freq Loss Factor Factor Level Level Line Limit dBuV dBuV/m dBuV/m MHz dB dB/m dB 1 pk 2390.00 5.34 28.57 38.11 46.17 41.97 74.00 -32.03 5.35 28.61 38.11 99.11 94.96 74.00 20.96 2 pp 2402.00



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Worse case mode: GFSK (DH5) Test channel: Lowest Remark: Peak Horizontal



Condition: 3m Horizontal

Job No: : 0616CR

Mode: : 2402 Band edge

: BT

	Freq			Preamp Factor				
-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
	2390.00							

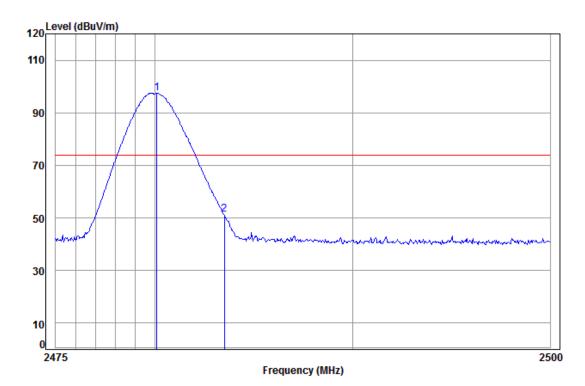




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Worse case mode: GFSK (DH5) Test channel: Highest Remark: Peak Vertical



Condition: 3m Vertical Job No: : 0616CR

Mode: : 2480 Band edge

: BT

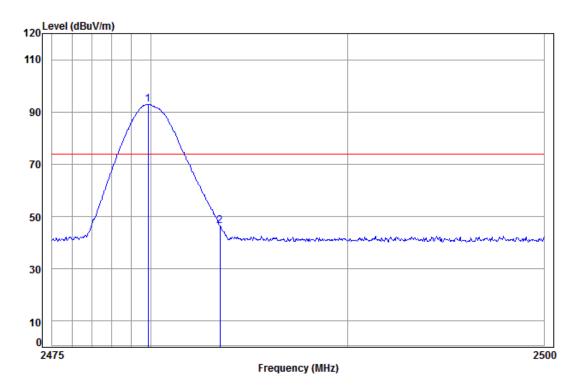
Cable Ant Preamp Read Limit 0ver Loss Factor Factor Level Level Limit Freq line dB MHz dB dBuV dBuV/m dBuV/m dB/m 2480.10 5.41 28.97 38.12 101.25 97.51 74.00 23.51 2 pk 2483.50 5.41 28.98 38.12 55.17 51.44 74.00 -22.56



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Worse case mode: GFSK (DH5) Test channel: Highest Remark: Peak Horizontal



Condition: 3m Horizontal

Job No: : 0616CR

Mode: : 2480 Band edge

: BT

				Preamp Factor			Freq	
dB	dBuV/m	dBuV/m	dBuV	dB	dB/m	dB	MHz	-
							2479.86 2483.50	

#### Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

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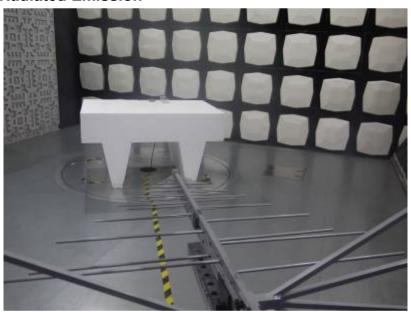
### 7 Photographs - EUT Test Setup

Test model No.: Hisense L675

#### 7.1 Conducted Emission



#### 7.2 Radiated Emission

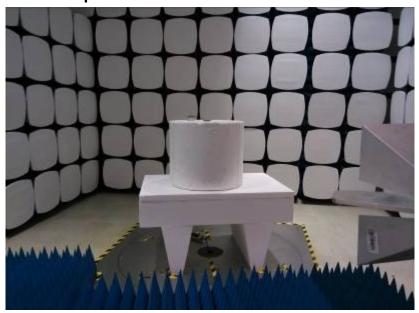




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### 7.3 Radiated Spurious Emission





### 8 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1601000468RG.