FCC Test Report

FCC ID	:	**VQK-F04G**
Equipment	:	**Mobile Phone**
Model No.	:	**F-04G**
Brand Name	:	**FUJITSU**
Applicant	:	**FUJITSU LIMITED**
Address	:	**1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki 211-8588, Japan**
Standard	:	**47 CFR FCC Part 15.249**
Received Date	:	**Dec. 17, 2014**
Tested Date	:	**Mar. 08 ~ Mar. 09, 2015**

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Approved & Reviewed by:

Gary Chang / Manager

Testing Laboratory
2732

Table of Contents

1 GENERAL DESCRIPTION 5

1.1 Information 5
1.2 Local Support Equipment List 6
1.3 Test Setup Chart 7
1.4 The Equipment List 8
1.5 Test Standards 9
1.6 Measurement Uncertainty 9

2 TEST CONFIGURATION 10

2.1 Testing Condition 10
2.2 The Worst Test Modes and Channel Details 10

3 TRANSMITTER TEST RESULTS 11

3.1 Conducted Emissions 11
3.2 Radiated Emission 16
3.3 20dB and Occupied Bandwidth 30

4 TEST LABORATORY INFORMATION 31

Release Record

Report No.	Version	Description	Issued Date
FR4D1701	Rev. 01	Initial issue	Apr. 01, 2015

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 0.568MHz 41.14 (Margin 4.86dB) - AV	Pass
15.249(a)	Field Strength of Fundamental	Meet the requirement of limit	Pass
15.249(a)(d)	Field Strength of Harmonics and Emissions Radiated outside of the Specified Frequency Bands	Meet the requirement of limit	Pass
15.215(c)	20dB bandwidth	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Product Details

Product Name	Mobile Phone
Brand Name	FUJITSU
Model Name	F-04G
IMEI Code	357241060024329 / 357241060024287
H/W Version	v2.1.0
S/W Version	R21.5e

1.1.2 Specification of the Equipment under Test (EUT)

RF General Information				
Frequency Range (MHz)	**Modulation**	**Ch. Freq. (MHz)**	**Channel Number**	**Data Rate**
2402-2480	GFSK	2402-2480	1-79 [79]	1 Mbps

1.1.3 Antenna Details

Ant. No.	Type	Gain (dBi)	Connector	Remark
1	Monopole antenna	-6.48	---	---

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	AC adapter: (normal output rating) 5.0Vdc, 1.8A (quick charge output rating) 9.0Vdc, 1.8A Battery: 3.75Vdc

1.1.5 Accessories

No.	Equipment	Description
1	Cradle	Brand Name: Fujitsu Limited Model Name: F50 Input rating: (quick charge) 9.0Vdc, 1.5A Output rating: (quick charge) 9.0Vdc, 1.5A
2	Battery (Unremovable)	Brand Name: NTT Docomo Model Name: CA54310-0061 Power Rating: 3.75Vdc, 3120mAh, 12Wh

1.1.6 Channel List

Frequency band (MHz)				2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	21	2422	41	2442	61	2462
2	2403	22	2423	42	2443	62	2463
3	2404	23	2424	43	2444	63	2464
4	2405	24	2425	44	2445	64	2465
5	2406	25	2426	45	2446	65	2466
6	2407	26	2427	46	2447	66	2467
7	2408	27	2428	47	2448	67	2468
8	2409	28	2429	48	2449	68	2469
9	2410	29	2430	49	2450	69	2470
10	2411	30	2431	50	2451	70	2471
11	2412	31	2432	51	2452	71	2472
12	2413	32	2433	52	2453	72	2473
13	2414	33	2434	53	2454	73	2474
14	2415	34	2435	54	2455	74	2475
15	2416	35	2436	55	2456	75	2476
16	2417	36	2437	56	2457	76	2477
17	2418	37	2438	57	2458	77	2478
18	2419	38	2439	58	2459	78	2479
19	2420	39	2440	59	2460	79	2480
20	2421	40	2441	60	2461	---	---

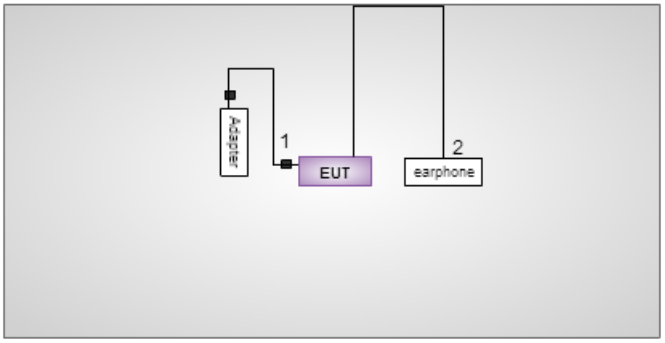
1.2 Local Support Equipment List

Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)
1	Adapter	NTT docomo	AC Adaptor 05	---	---	---
2	Earphone	APPLE	MD827FE/A	6	---	1.2m non-shielded w/o core

Note: Item 1 was provided by client.

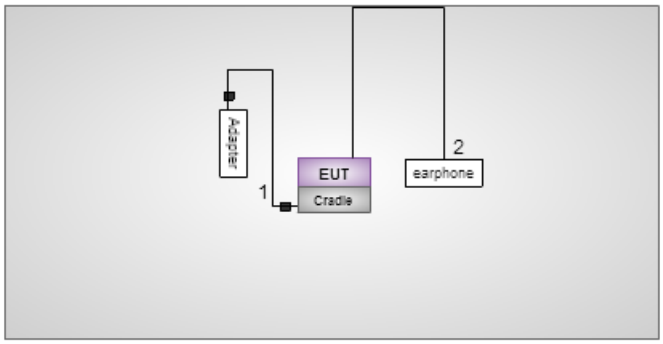
1.3 Test Setup Chart

Test Setup Diagram (Adapter mode)



1. 1.2m non-shielded with 2 cores
2. 1.2m non-shielded w/o core

Test Setup Diagram (Cradle mode)



1. 1.2m non-shielded with 2 cores
2. 1.2m non-shielded w/o core

1.4 The Equipment List

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101498	Dec. 09, 2014	Dec. 08, 2015
Receiver	R&S	ESR3	101658	Nov. 10, 2014	Nov. 09, 2015
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Sep. 05, 2014	Sep. 04, 2015
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 10, 2014	Nov. 09, 2015
Preamplifier	Burgeon	BPA-530	SN:100219	Sep. 09, 2014	Sep. 08, 2015
Preamplifier	Agilent	83017A	MY39501308	Oct. 09, 2014	Oct. 08, 2015
Preamplifier	EMC	EMC184045B	980192	Aug. 26, 2014	Aug. 25, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 15, 2014	Dec. 14, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 15, 2014	Dec. 14, 2015
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 15, 2014	Dec. 14, 2015
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 15, 2014	Dec. 14, 2015
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 15, 2014	Dec. 14, 2015
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
EMC Receiver	R&S	ESCS 30	100169	Oct. 17, 2014	Oct. 16, 2015
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 17, 2014	Nov. 16, 2015
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 31, 2014	Dec. 30, 2015
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.249
ANSI C63.10-2013

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty	
Parameters	**Uncertainty**
Bandwidth	±34.134 Hz
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.99 dB
Radiated emission > 1GHz	±5.52 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	18°C / 76%	Peter Lin
Radiated Emissions	03CH03-WS	20°C / 64-65%	Haru Yang
RF Conducted	TH01-WS	22°C / 65%	Brad Wu

- FCC site registration No.: 390588
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate	Test Configuration
AC Power Line Conducted Emissions	GFSK	2441	1 Mbps	1, 2
Field Strength of Fundamental	GFSK	2402, 2441, 2480	1 Mbps	1
Radiated Emissions ≤ 1GHz	GFSK	2441	1 Mbps	1, 2
Radiated Emissions > 1GHz	GFSK	2402, 2441, 2480	1 Mbps	1
20dB bandwidth	GFSK	2402, 2441, 2480	1 Mbps	1

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.
2. The EUT had been tested by following test configurations for radiated emission below 1GHz.
   1) Configuration 1 : Adapter mode
   2) Configuration 2 : Cradle mode
3. Adapter and cradle mode had been pretested for radiated emission above 1GHz and found that the adapter mode was the worst case and was selected for final test.

3 Transmitter Test Results

3.1 Conducted Emissions

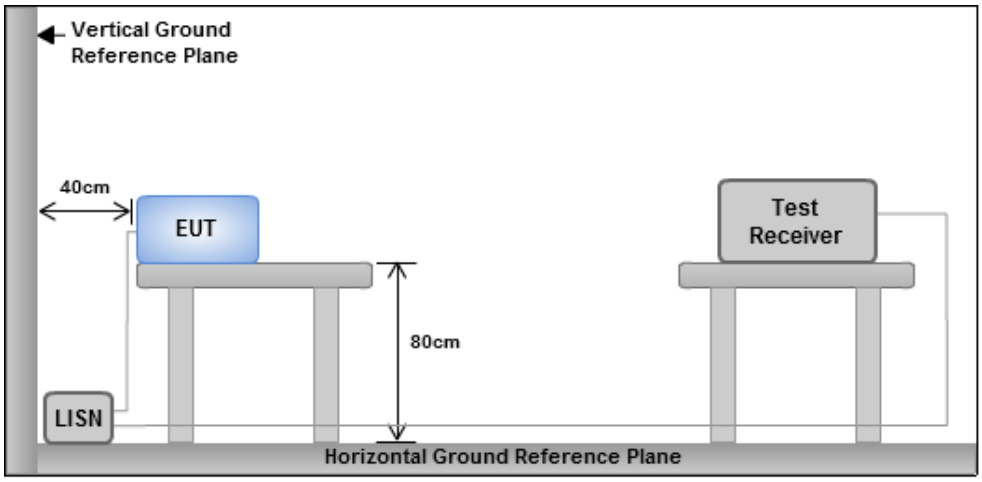
3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

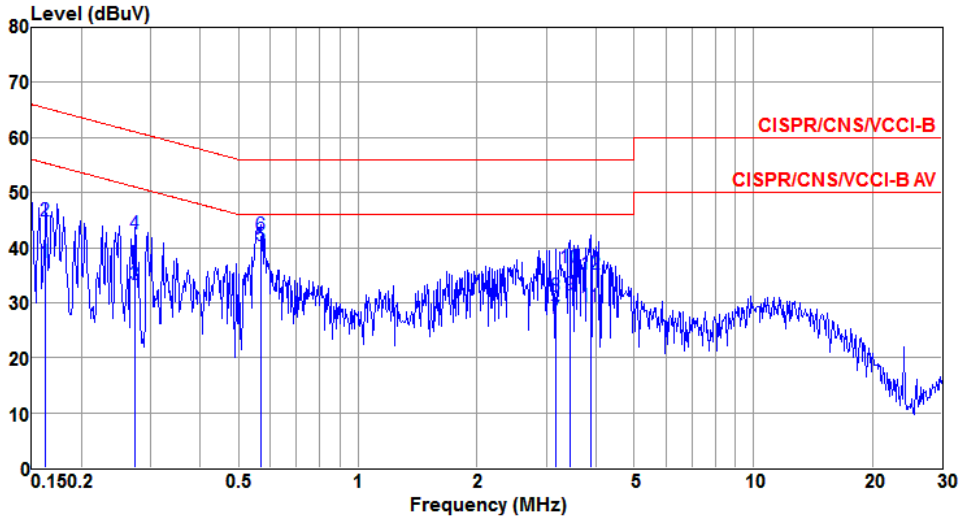
3.1.3 Test Setup



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

3.1.4 Test Result of Conducted Emissions

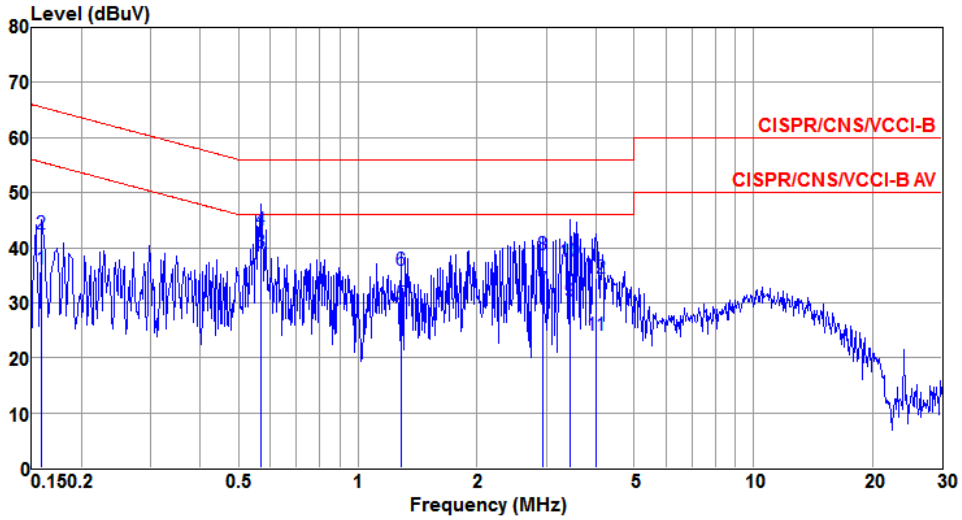
Power Phase	Line	Test Freq. (MHz)	2441
Test Configuration	1		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.162	37.35	55.34	-17.99	36.54	0.73	0.08	Average
2	0.162	44.82	65.34	-20.52	44.01	0.73	0.08	QP
3	0.273	33.23	51.03	-17.80	32.91	0.22	0.10	Average
4	0.273	42.41	61.03	-18.62	42.09	0.22	0.10	QP
5*	0.567	40.47	46.00	-5.53	40.19	0.15	0.13	Average
6	0.567	42.30	56.00	-13.70	42.02	0.15	0.13	QP
7	3.156	27.25	46.00	-18.75	26.57	0.39	0.29	Average
8	3.156	31.17	56.00	-24.83	30.49	0.39	0.29	QP
9	3.436	31.29	46.00	-14.71	30.66	0.34	0.29	Average
10	3.436	36.47	56.00	-19.53	35.84	0.34	0.29	QP
11	3.881	29.17	46.00	-16.83	28.58	0.28	0.31	Average
12	3.881	35.17	56.00	-20.83	34.58	0.28	0.31	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

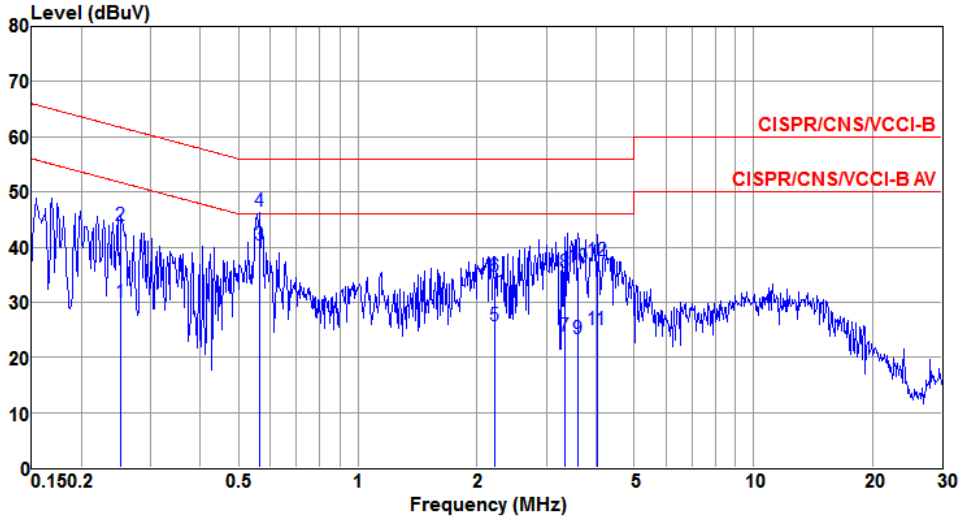
Power Phase	Neutral	Test Freq. (MHz)	2441
Test Configuration	1		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.159	36.09	55.52	-19.43	35.28	0.73	0.08	Average
2	0.159	42.58	65.52	-22.94	41.77	0.73	0.08	QP
3*	0.570	39.17	46.00	-6.83	38.86	0.18	0.13	Average
4	0.570	43.16	56.00	-12.84	42.85	0.18	0.13	QP
5	1.289	29.71	46.00	-16.29	29.27	0.25	0.19	Average
6	1.289	35.79	56.00	-20.21	35.35	0.25	0.19	QP
7	2.946	32.44	46.00	-13.56	31.65	0.51	0.28	Average
8	2.946	38.78	56.00	-17.22	37.99	0.51	0.28	QP
9	3.436	30.23	46.00	-15.77	29.31	0.63	0.29	Average
10	3.436	37.58	56.00	-18.42	36.66	0.63	0.29	QP
11	4.006	24.08	46.00	-21.92	23.03	0.74	0.31	Average
12	4.006	34.50	56.00	-21.50	33.45	0.74	0.31	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

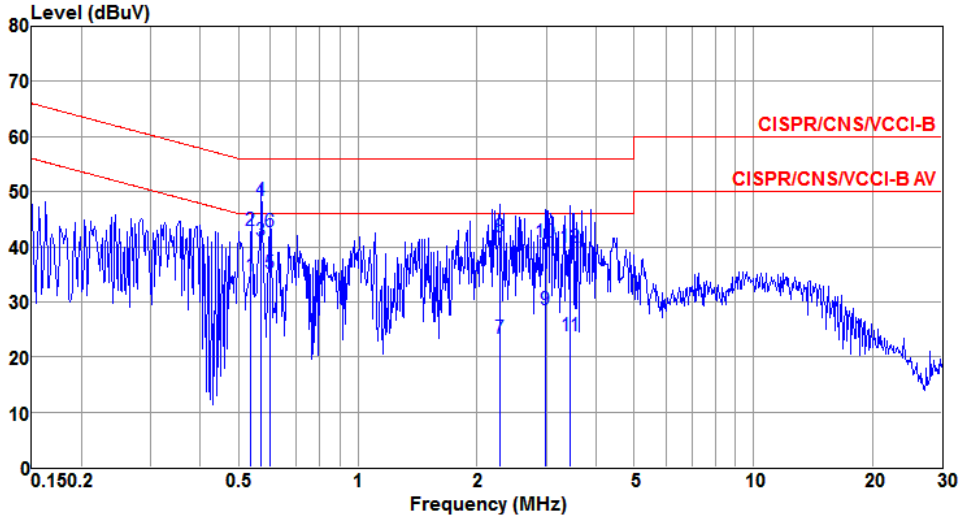
Power Phase	Line	Test Freq. (MHz)	2441
Test Configuration	2		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.252	29.95	51.69	-21.74	29.62	0.23	0.10	Average
2	0.252	43.84	61.69	-17.85	43.51	0.23	0.10	QP
3*	0.565	40.28	46.00	-5.72	40.00	0.15	0.13	Average
4	0.565	46.52	56.00	-9.48	46.24	0.15	0.13	QP
5	2.213	25.75	46.00	-20.25	24.93	0.57	0.25	Average
6	2.213	34.60	56.00	-21.40	33.78	0.57	0.25	QP
7	3.328	23.74	46.00	-22.26	23.09	0.36	0.29	Average
8	3.328	35.36	56.00	-20.64	34.71	0.36	0.29	QP
9	3.603	23.49	46.00	-22.51	22.87	0.32	0.30	Average
10	3.603	36.47	56.00	-19.53	35.85	0.32	0.30	QP
11	4.027	25.08	46.00	-20.92	24.51	0.26	0.31	Average
12	4.027	37.58	56.00	-18.42	37.01	0.26	0.31	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Power Phase	Neutral	Test Freq. (MHz)	2441
Test Configuration	2		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.535	34.60	46.00	-11.40	34.30	0.17	0.13	Average
2	0.535	43.01	56.00	-12.99	42.71	0.17	0.13	QP
3*	0.568	41.14	46.00	-4.86	40.83	0.18	0.13	Average
4	0.568	48.41	56.00	-7.59	48.10	0.18	0.13	QP
5	0.599	35.12	46.00	-10.88	34.80	0.19	0.13	Average
6	0.599	42.81	56.00	-13.19	42.49	0.19	0.13	QP
7	2.281	23.42	46.00	-22.58	22.85	0.32	0.25	Average
8	2.281	41.86	56.00	-14.14	41.29	0.32	0.25	QP
9	2.978	28.48	46.00	-17.52	27.68	0.52	0.28	Average
10	2.978	40.73	56.00	-15.27	39.93	0.52	0.28	QP
11	3.454	23.86	46.00	-22.14	22.93	0.63	0.30	Average
12	3.454	39.96	56.00	-16.04	39.03	0.63	0.30	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

3.2 Radiated Emission

This section includes field strength of fundamental, field strength of harmonics and emissions radiated outside of the operating frequency bands.

3.2.1 Limit of field strength of fundamental and field strength of harmonics

Fundamental Frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
2400–2483.5 MHz	50	500

3.2.2 Limit of Unwanted Emissions

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Radiated emission limits in §15.209			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.2.3 Test Procedures

1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

1. Radiated emission below 1GHz
   120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission
2. Radiated emission above 1GHz / Peak value except fundamental
   RBW=1MHz, VBW=3MHz and Peak detector
3. Radiated emission above 1GHz / Average value for field strength of fundamental and harmonics
   The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

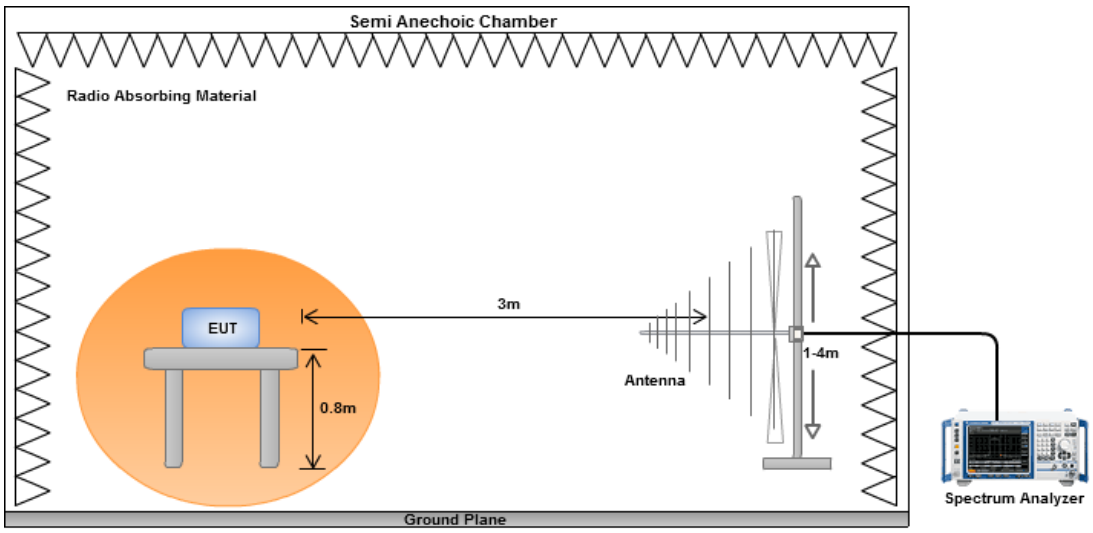
$$20\log(\text{Duty cycle}) = 20\log\frac{50^* \ 0.22464\ \text{ms}}{100\ \text{ms}} = -18.99\text{dB}$$

   Please see page 29 for plotted duty

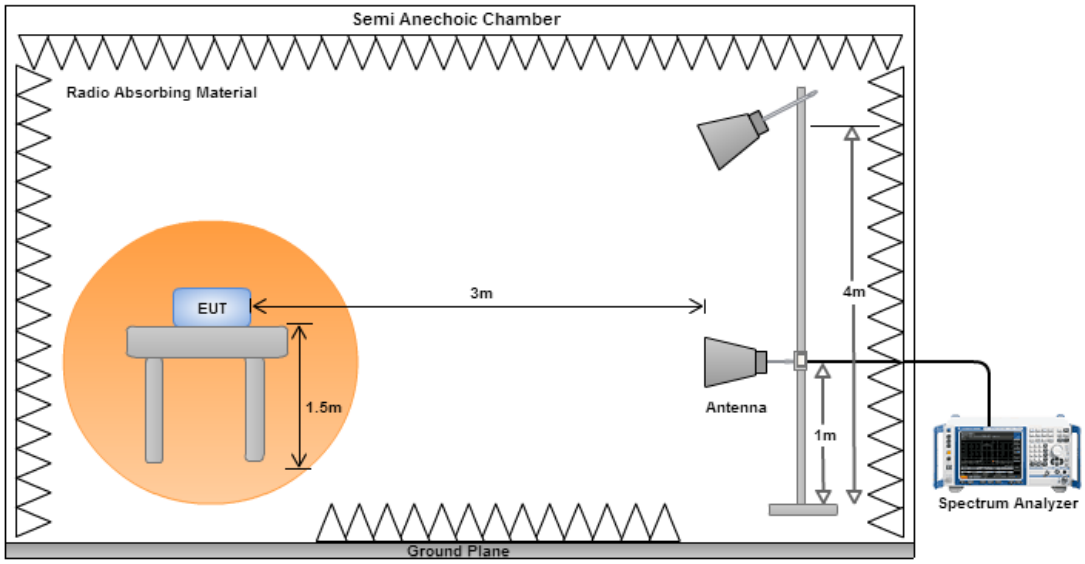
4. Radiated emission above 1GHz / Average value for other emissions
   RBW=1MHz, VBW=10Hz and Peak detector
5. Radiated emission Peak value for fundamental
   RBW=3MHz, VBW=10MHz and Peak detector

3.2.4 Test Setup

Radiated Emissions below 1 GHz

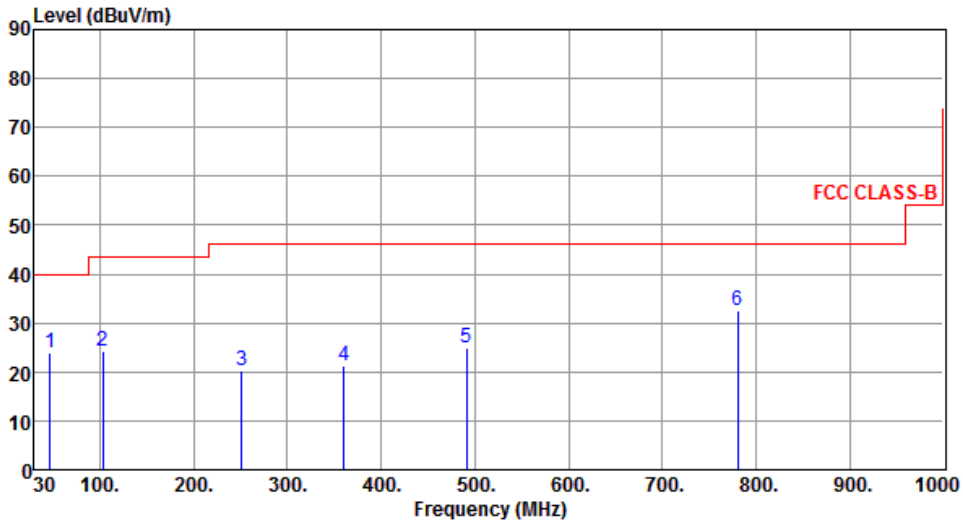


Radiated Emissions above 1 GHz



3.2.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)

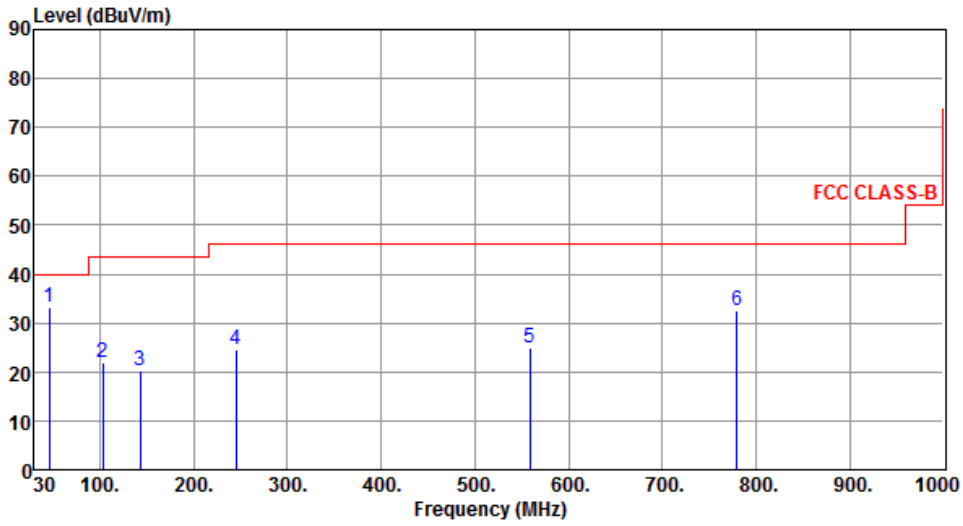
Modulation	GFSK	**Test Freq. (MHz)**	2441
Polarization	Horizontal	**Test Configuration**	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	46.49	23.78	40.00	-16.22	36.63	-12.85	Peak	---	---
2	102.75	24.17	43.50	-19.33	42.10	-17.93	Peak	---	---
3	251.16	20.29	46.00	-25.71	34.98	-14.69	Peak	---	---
4	360.77	21.26	46.00	-24.74	32.41	-11.15	Peak	---	---
5	490.75	24.96	46.00	-21.04	32.81	-7.85	Peak	---	---
6	780.78	32.40	46.00	-13.60	35.20	-2.80	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

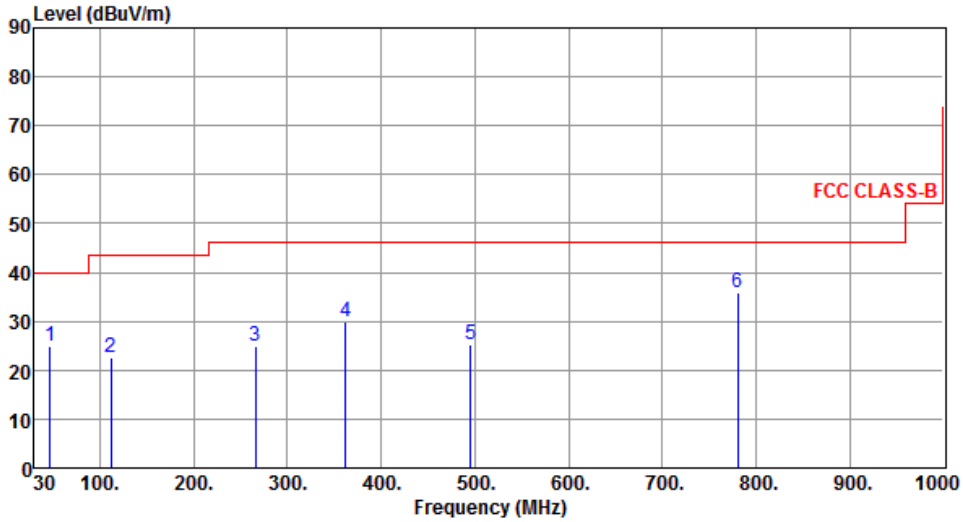
Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	45.52	33.22	40.00	-6.78	46.05	-12.83	Peak	---	---
2	102.75	21.96	43.50	-21.54	39.89	-17.93	Peak	---	---
3	142.52	20.20	43.50	-23.30	33.85	-13.65	Peak	---	---
4	245.34	24.72	46.00	-21.28	39.45	-14.73	Peak	---	---
5	558.65	25.00	46.00	-21.00	31.82	-6.82	Peak	---	---
6	779.81	32.64	46.00	-13.36	35.45	-2.81	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

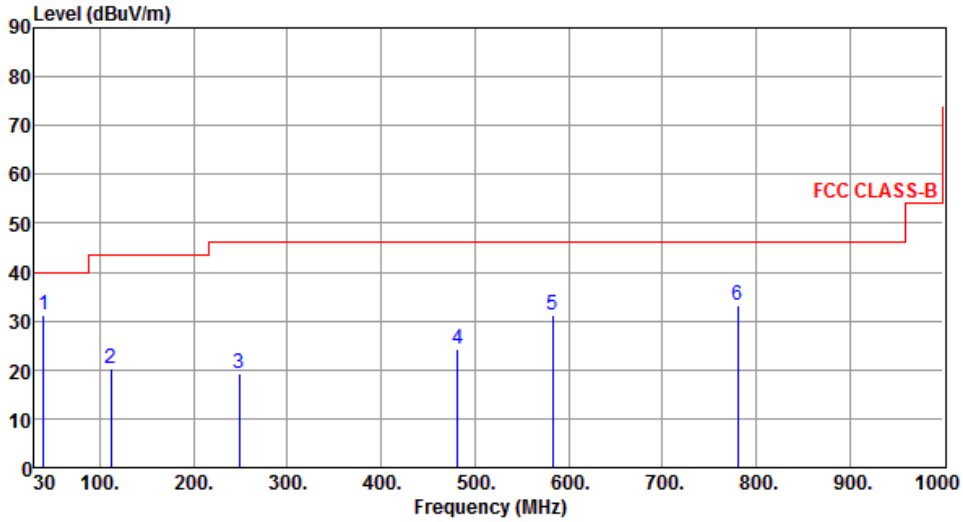
Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Horizontal	Test Configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	46.49	25.06	40.00	-14.94	37.91	-12.85	Peak	---	---
2	111.48	22.73	43.50	-20.77	39.21	-16.48	Peak	---	---
3	265.71	24.86	46.00	-21.14	38.93	-14.07	Peak	---	---
4	361.74	30.02	46.00	-15.98	41.13	-11.11	Peak	---	---
5	495.60	25.20	46.00	-20.80	32.94	-7.74	Peak	---	---
6	780.78	36.01	46.00	-9.99	38.81	-2.80	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical	Test Configuration	2

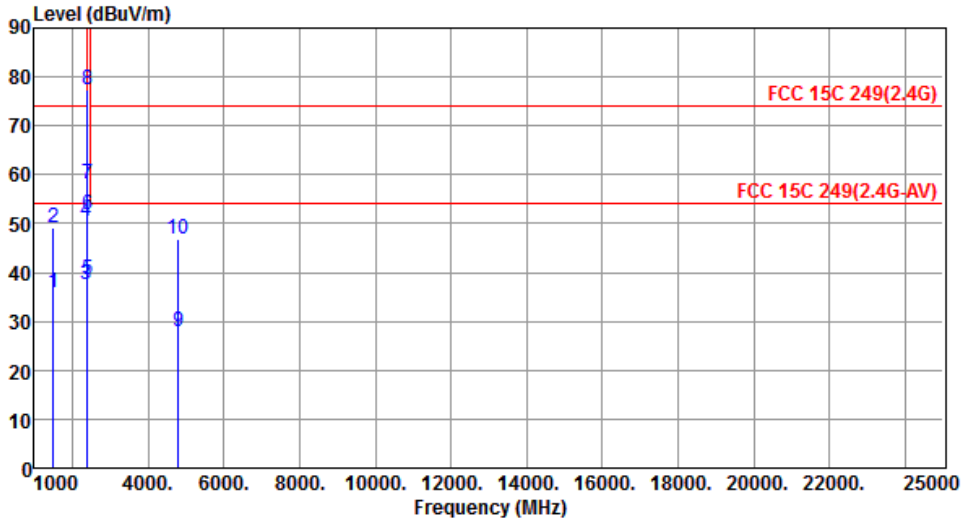


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	39.70	31.19	40.00	-8.81	44.38	-13.19	Peak	---	---
2	111.48	20.25	43.50	-23.25	36.73	-16.48	Peak	---	---
3	248.25	19.39	46.00	-26.61	34.11	-14.72	Peak	---	---
4	482.02	24.41	46.00	-21.59	32.45	-8.04	Peak	---	---
5	582.90	31.18	46.00	-14.82	37.36	-6.18	Peak	---	---
6	780.78	33.33	46.00	-12.67	36.13	-2.80	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.2.6 Transmitter Radiated Unwanted Emissions (Above 1GHz)

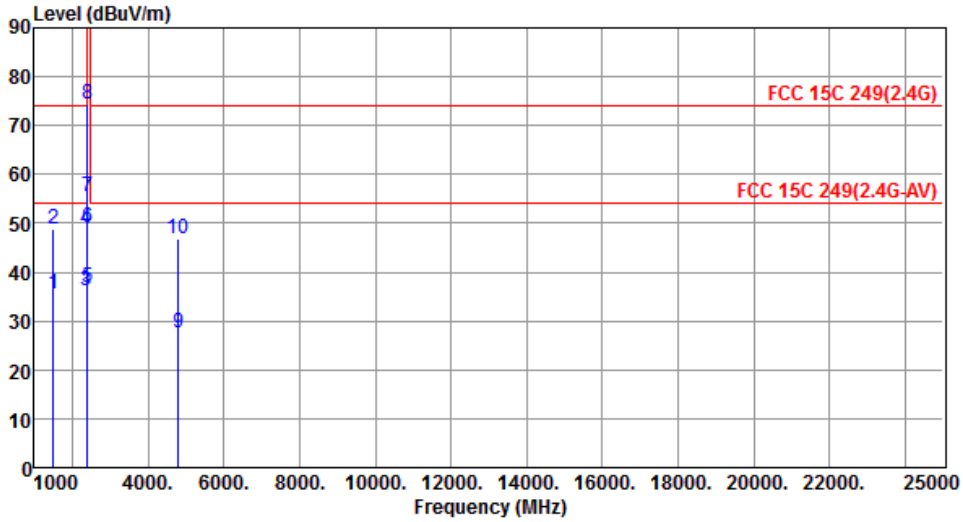
Modulation	GFSK	**Test Freq. (MHz)**	2402
Polarization	Horizontal	**Test Configuration**	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1500.00	35.83	54.00	-18.17	39.66	-3.83	Average	---	---
2	1500.00	49.05	74.00	-24.95	52.88	-3.83	Peak	---	---
3	2390.00	37.39	54.00	-16.61	38.61	-1.22	Average	---	---
4	2390.00	50.58	74.00	-23.42	51.80	-1.22	Peak	---	---
5	2400.00	38.66	54.00	-15.34	39.85	-1.19	Average	---	---
6	2400.00	51.75	74.00	-22.25	52.94	-1.19	Peak	---	---
7	2402.00	58.24	94.00	-35.76	59.43	-1.19	Average	---	---
8	2402.00	77.23	114.00	-36.77	78.42	-1.19	Peak	---	---
9	4804.00	27.76	54.00	-26.24	20.65	7.11	Average	---	---
10	4804.00	46.75	74.00	-27.25	39.64	7.11	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

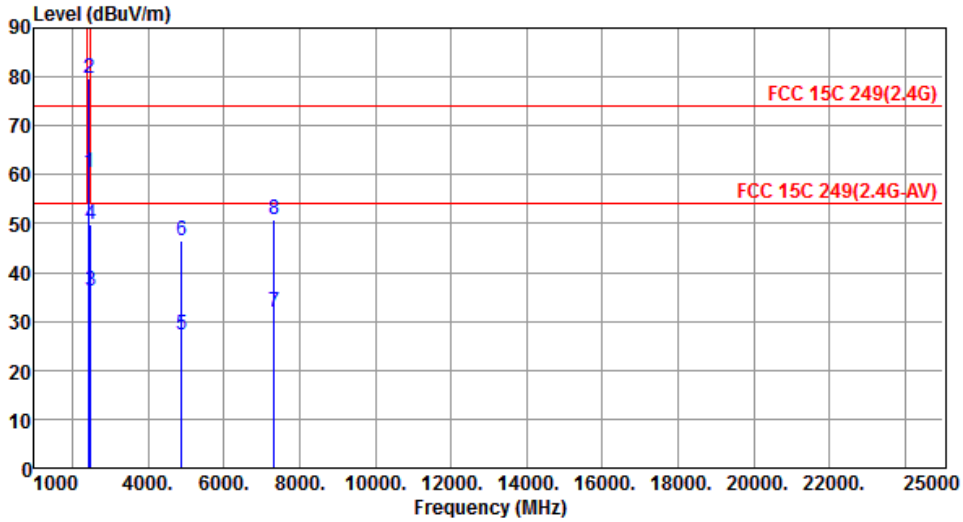
Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1500.00	35.56	54.00	-18.44	39.39	-3.83	Average	---	---
2	1500.00	48.88	74.00	-25.12	52.71	-3.83	Peak	---	---
3	2390.00	36.18	54.00	-17.82	37.40	-1.22	Average	---	---
4	2390.00	48.86	74.00	-25.14	50.08	-1.22	Peak	---	---
5	2400.00	36.72	54.00	-17.28	37.91	-1.19	Average	---	---
6	2400.00	49.31	74.00	-24.69	50.50	-1.19	Peak	---	---
7	2402.00	55.47	94.00	-38.53	56.66	-1.19	Average	---	---
8	2402.00	74.46	114.00	-39.54	75.65	-1.19	Peak	---	---
9	4804.00	27.68	54.00	-26.32	20.57	7.11	Average	---	---
10	4804.00	46.67	74.00	-27.33	39.56	7.11	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

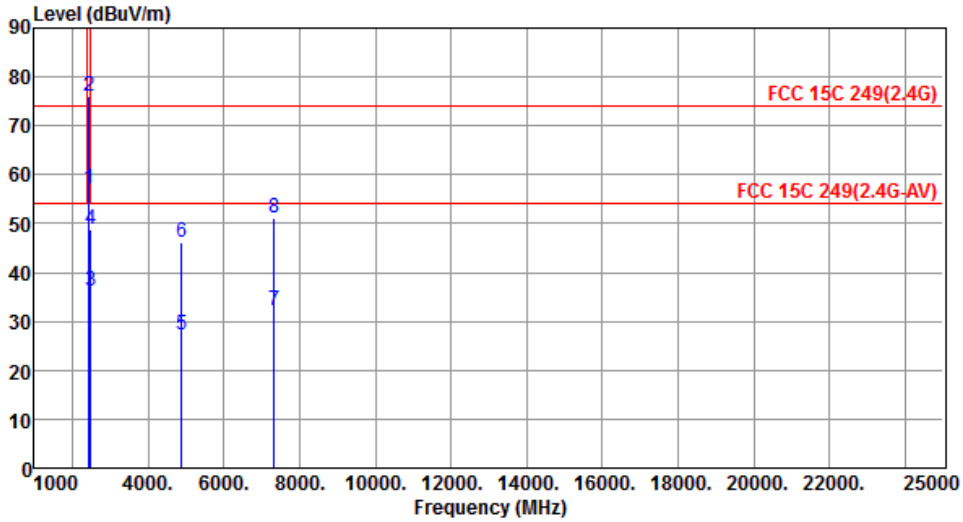
Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Horizontal	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2441.00	60.56	94.00	-33.44	61.60	-1.04	Average	---	---
2	2441.00	79.55	114.00	-34.45	80.59	-1.04	Peak	---	---
3	2483.50	36.04	54.00	-17.96	36.93	-0.89	Average	---	---
4	2483.50	49.98	74.00	-24.02	50.87	-0.89	Peak	---	---
5	4882.00	27.35	54.00	-26.65	20.58	6.77	Average	---	---
6	4882.00	46.34	74.00	-27.66	39.57	6.77	Peak	---	---
7	7323.00	31.95	54.00	-22.05	20.96	10.99	Average	---	---
8	7323.00	50.94	74.00	-23.06	39.95	10.99	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

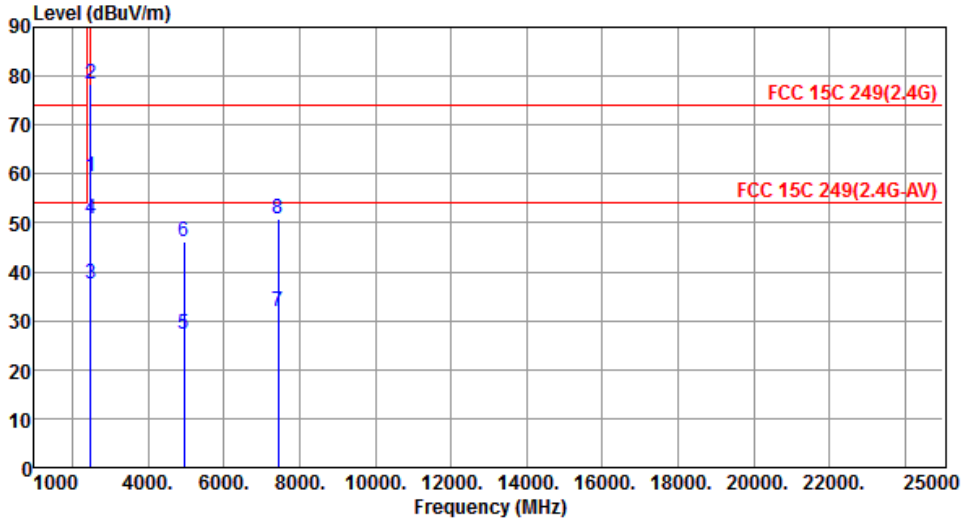
Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2441.00	57.12	94.00	-36.88	58.16	-1.04	Average	---	---
2	2441.00	76.11	114.00	-37.89	77.15	-1.04	Peak	---	---
3	2483.50	36.17	54.00	-17.83	37.06	-0.89	Average	---	---
4	2483.50	48.91	74.00	-25.09	49.80	-0.89	Peak	---	---
5	4882.00	27.27	54.00	-26.73	20.50	6.77	Average	---	---
6	4882.00	46.26	74.00	-27.74	39.49	6.77	Peak	---	---
7	7323.00	32.16	54.00	-21.84	21.17	10.99	Average	---	---
8	7323.00	51.15	74.00	-22.85	40.16	10.99	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

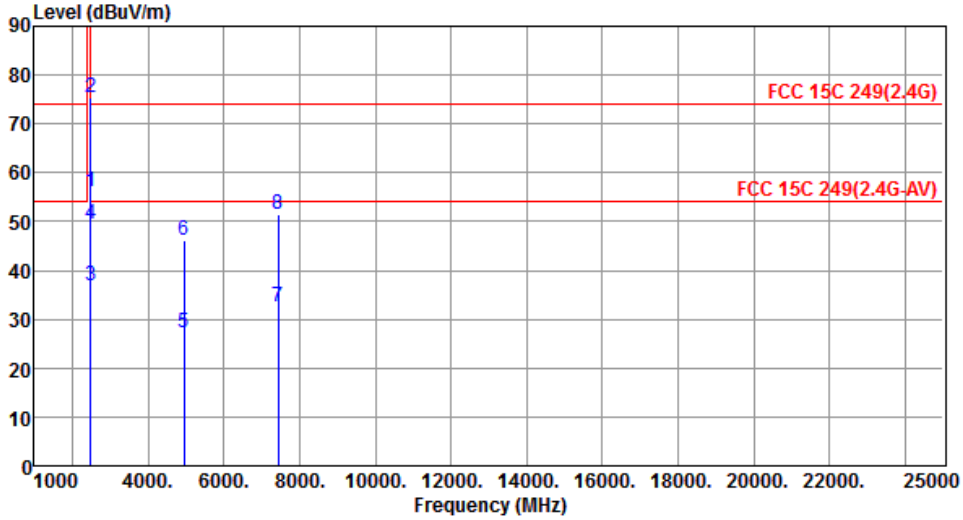
Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Horizontal	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2480.00	59.48	94.00	-34.52	60.38	-0.90	Average	---	---
2	2480.00	78.47	114.00	-35.53	79.37	-0.90	Peak	---	---
3	2483.50	37.65	54.00	-16.35	38.54	-0.89	Average	---	---
4	2483.50	50.80	74.00	-23.20	51.69	-0.89	Peak	---	---
5	4960.00	27.28	54.00	-26.72	20.82	6.46	Average	---	---
6	4960.00	46.27	74.00	-27.73	39.81	6.46	Peak	---	---
7	7440.00	31.92	54.00	-22.08	20.65	11.27	Average	---	---
8	7440.00	50.91	74.00	-23.09	39.64	11.27	Peak	---	---

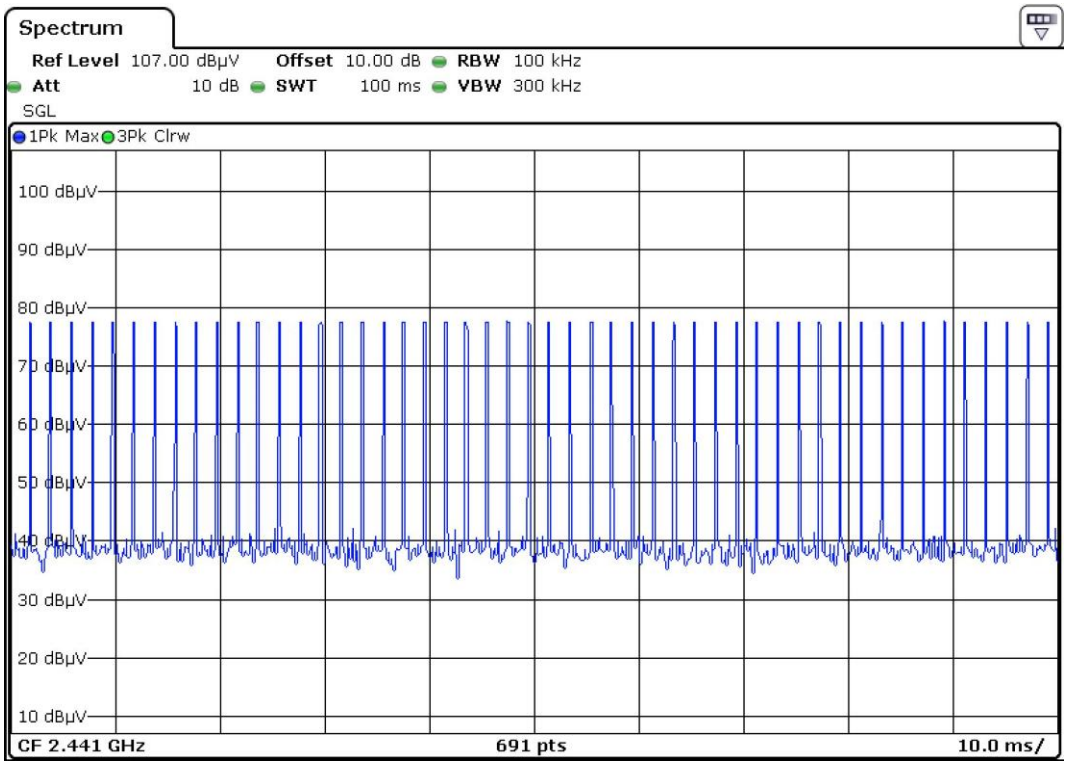
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

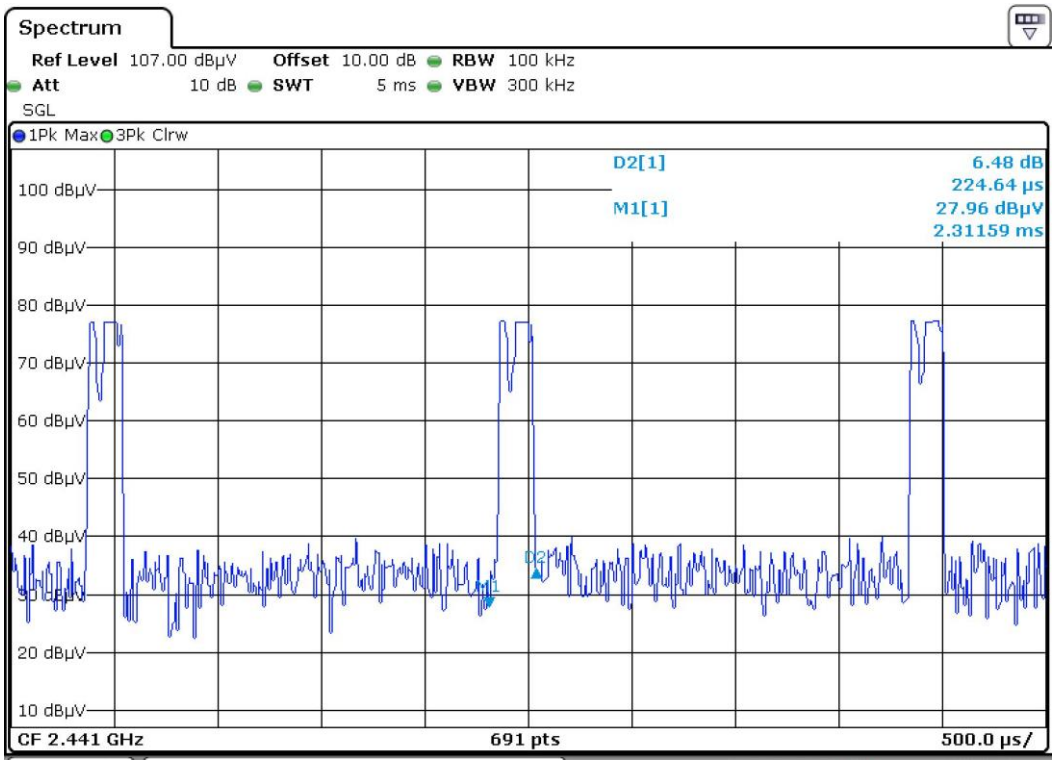
Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Vertical	Test Configuration	1



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2480.00	56.29	94.00	-37.71	57.19	-0.90	Average	---	---
2	2480.00	75.28	114.00	-38.72	76.18	-0.90	Peak	---	---
3	2483.50	36.77	54.00	-17.23	37.66	-0.89	Average	---	---
4	2483.50	49.36	74.00	-24.64	50.25	-0.89	Peak	---	---
5	4960.00	27.28	54.00	-26.72	20.82	6.46	Average	---	---
6	4960.00	46.27	74.00	-27.73	39.81	6.46	Peak	---	---
7	7440.00	32.61	54.00	-21.39	21.34	11.27	Average	---	---
8	7440.00	51.60	74.00	-22.40	40.33	11.27	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).





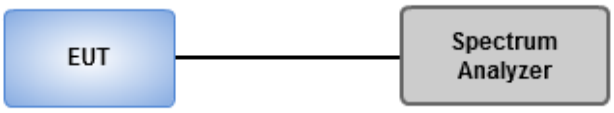
$$20\log(\text{Duty cycle}) = 20\log\frac{50^* \ 0.22464\ \text{ms}}{100\ \text{ms}} = -18.99\text{dB}$$

3.3 20dB and Occupied Bandwidth

3.3.1 Test Procedures

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission.
5. Use the occupied measurement function of specturm analyzer to measure 99% occupied bandwidth

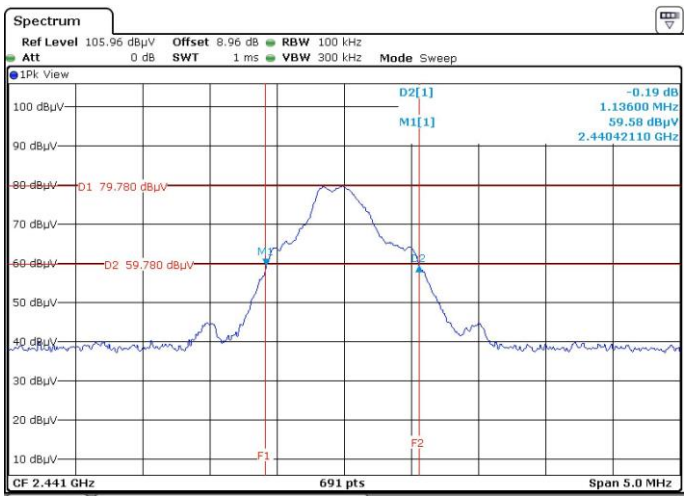
3.3.2 Test Setup



3.3.3 20dB and Occupied Bandwidth

Freq. (MHz)	20dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
2402	1.13	1.04
2441	1.14	1.03
2480	1.13	1.03

Worst Plots



4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website http://www.icertifi.com.tw.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

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