Full

TEST REPORT

No. I16D00012-BLE

For

Client : Medical Alarm Concepts

Production : 3G mobile personal emergency response device

Model Name : CS399-PD

FCC ID: XWI-CS399

Hardware Version: V2.0

Software Version: CS399_YD_72KK_V01

Issued date: 2016-04-25

Test Laboratory:

ECIT Shanghai, East China Institute of Telecommunications

Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: (+86)-021-63843300, E-Mail: welcome@ecit.org.cn

Revision Version

Report Number	Revision	Date	Memo
I16D00012-BLE	00	2016-04-25	Initial creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301

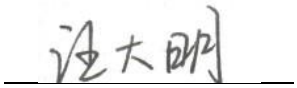
1.2. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	-10/+55℃
Relative Humidity:	20-75%

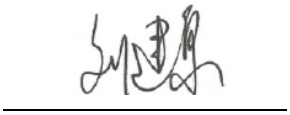
1.3. Project data

Project Leader:	Yu Anlu
Testing Start Date:	2016-01-22
Testing End Date:	2016-04-25

1.4. Signature



Wang Daming
(Prepared this test report)



Liu Jianquan
(Reviewed this test report)

Zheng Zhongbin
Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Medical Alarm Concepts
Address:	200 West Church Rd., Suite B, King of Prussia, PA, USA
Telephone:	1-215-850-4600
Postcode:	19406

2.2. Manufacturer Information

Company Name:	Xi'an iHelp Wearable Electronic Co.Ltd
Address:	Innovative Business Building No. 2,#69 Jinye Road,Xi'an,China
Telephone:	029-88311435-8003
Postcode:	710077

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	3G mobile personal emergency response device
Model name	CS399-PD
UMTS Frequency Band	WCDMA Band 850/1700/1900/900/2100
GSM Frequency Band	n/a
BLE Frequency	2402MHz-2480Mhz
BLE Channel	Channel0-Channel39
BLE Modulation	GFSK
Extreme Temperature	-10/+55℃
Nominal Voltage	3.8V
Extreme High Voltage	4.2V
Extreme Low Voltage	3.4V

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N02	N/A	V2.0	CS399_YD_72KK_V01	2016-01-21

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	RF cable	---
AE2	---	---

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15,Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.	2014
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

5. Summary of Test Results

A brief summary of the tests carried out is shown as following.

Measurement Items	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247(b)	/	P
Peak Power Spectral Density	15.247(e)	/	P
6dB Occupied Bandwidth	15.247(a)	/	P
Band Edges Compliance	15.247(d)	/	P
Transmitter Spurious Emission-Conducted	15.247	/	P
Transmitter Spurious Emission-Radiated	15.247	/	P
AC Powerline Conducted Emission	15.107,15.207	/	NA

Please refer to part 5 for detail.

The measurements are according to ANSI C63.10.

Terms used in Verdict column

P	Pass, the EUT complies with the essential requirements in the standard.
NP	Not Perform, the test was not performed by ECIT.
NA	Not Applicable, the test was not applicable.
F	Fail, the EUT does not comply with the essential requirements in the standard.

Test Conditions

Tnom	Normal Temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	22℃
Voltage	Vnom	3.8V
Humidity	Hnom	32%
Air Pressure	Anom	1010hPa

Note:

a. All the test data for each data were verified, but only the worst case was reported.

b.The GFSK, π/4 DQPSK and 8DPSK were set in DH1 for GFSK, 2-DH1 for π/4 DQPSK, 3-DH1 for 8DPSK.

c.The DC and low frequency voltages' measurement uncertainty is ±2%.

5.1. Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

The following deviation from, additions to, or exclusions from the test specifications have been made. See section 3.

5.2. Statements

The product name CS399-PD, supporting WCDMA/HSDPA/HSUPA/BT/BLE manufactured by Xi'an iHelp Wearable Electronic Co.Ltd, is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

6. Test result

6.1. Peak Output Power-Conducted

6.1.1 Measurement Limit

Standard	Limit (dBm)
FCC Part 15.247(b)(1)	< 30

6.1.2 Test Condition:

Hopping Mode	RBW	VBW	Span	Sweeptime
Hopping OFF	3MHz	10MHz	9MHz	Auto

6.1.3 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.5.

1. The output power of EUT was connected to the spectrum analyzer by cable. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Measure the conducted output power and record the results it.

6.1.4 Measurement Results:

For GFSK

Channel	Ch0 2402 MHz	Ch19 2440 MHz	CH39 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	-1.50	-1.34	-1.78	P
	Fig.1	Fig.2	Fig.3	

Conclusion: PASS

Test graphs an below

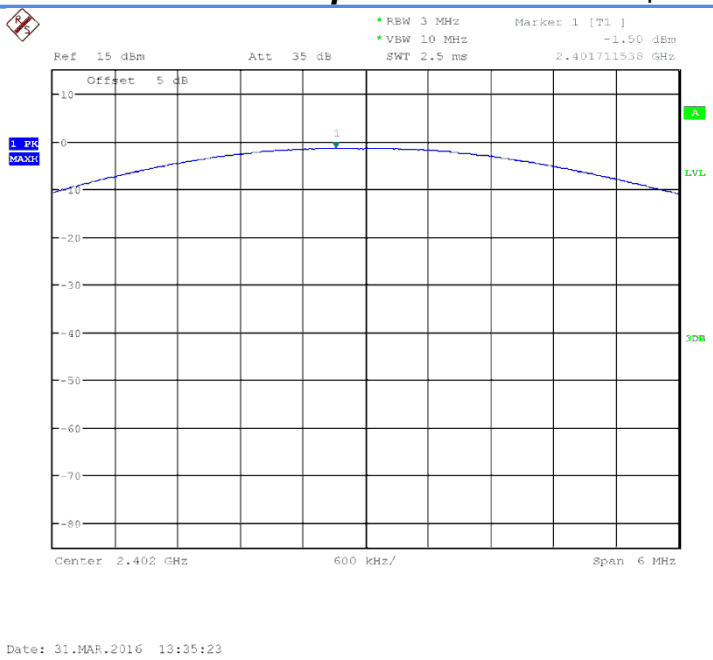


Fig.1 Peak Conducted Output Power CH0, DH1

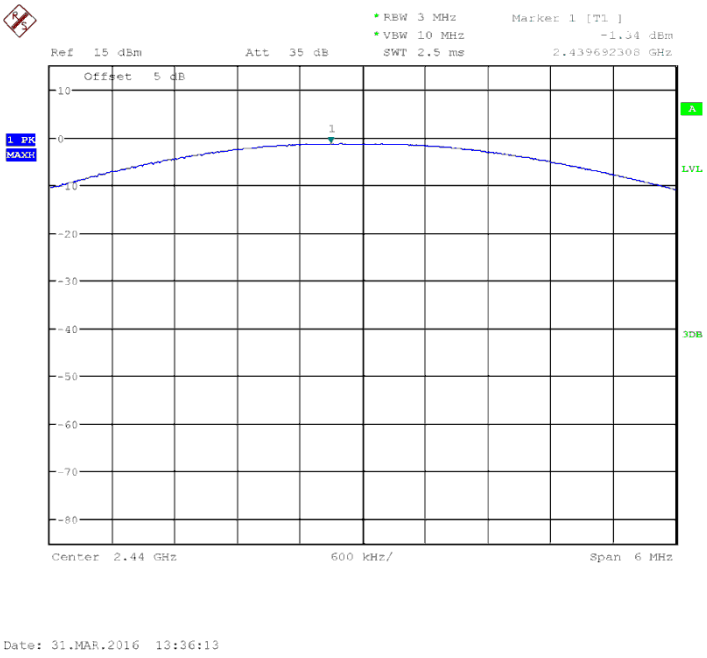


Fig.2 Peak Conducted Output Power CH19, DH1

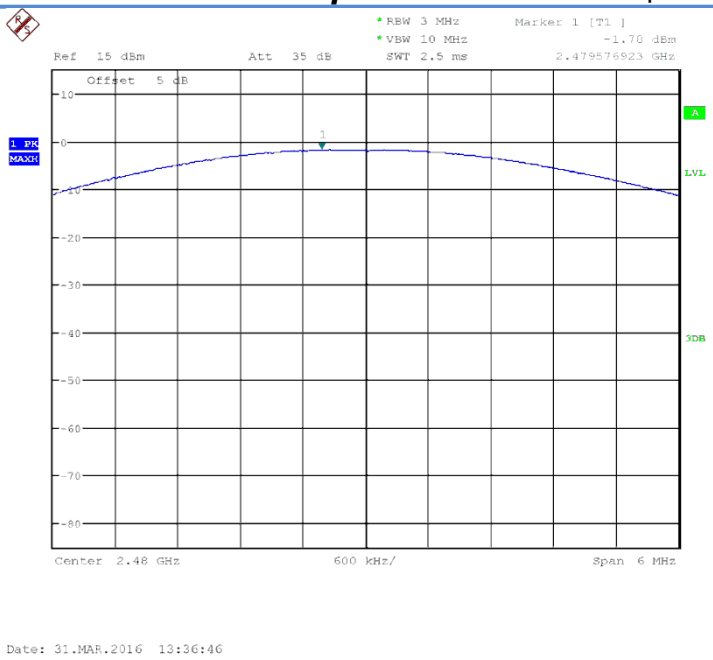


Fig.3 Peak Conducted Output Power CH39, DH1

6.2. Peak Power Spectral Density

6.2.1 Measurement Limit:

Standard	Limit
FCC CFR Part 15.247(e)	< 8dBm/3 KHz

6.2.2 Test procedures

The measurement is according to ANSI C63.10 clause 11.10.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set analyzer center frequency to DTS channel center frequency.
4. Set the span to 1.5 times the DTS bandwidth.
5. Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.
6. Set the VBW ≥ [3 × RBW].
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum amplitude level within the RBW.
12. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

6.2.3 Measurement Uncertainty:

Measurement Uncertainty	±0.75dB

6.2.4 Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
BT4.0	00	Fig.4	-17.46	P
	19	Fig.5	-17.35	P
	39	Fig.6	-17.68	P

Test figure as below:

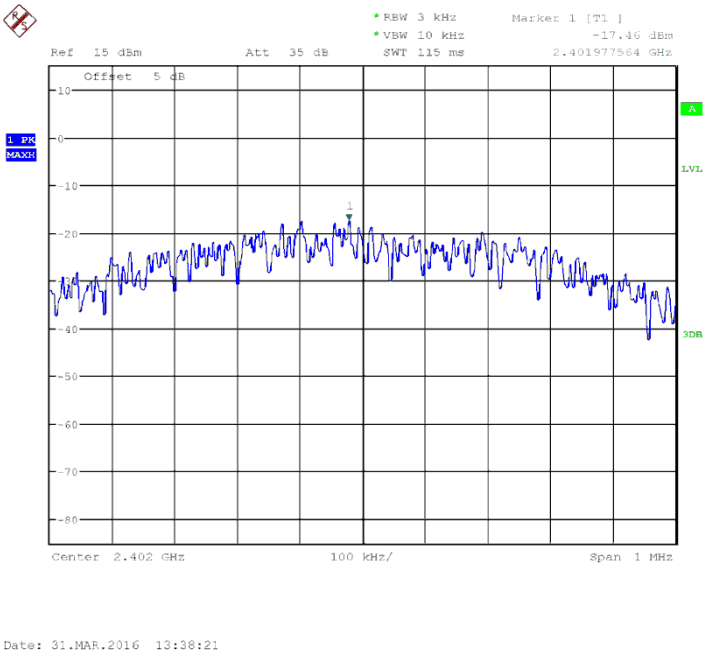


Fig.4 Power spectral density: CH0

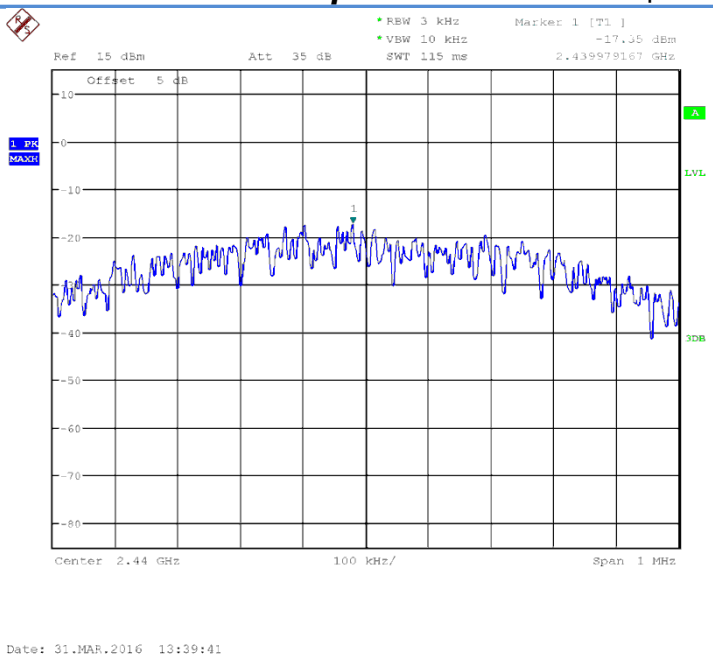


Fig.5 Power spectral density: CH19

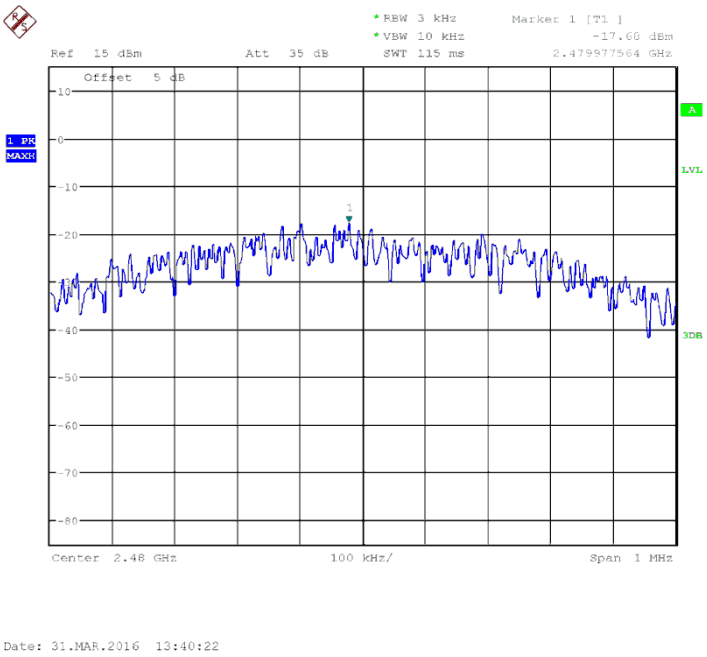


Fig.6 Power spectral density: CH39

6.3. 6dB Bandwidth

6.3.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (a) (1)	N/A

6.3.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.7

1. Connect the EUT through cable and divide with CBT32 and spectrum analyzer.
2. Enable the EUT transmit maximum power.
3. Set the spectrum analyzer as
4. Span: two or five times of OBW
5. RBW= 1% to 5% of the OBW; VBW≥3RBW; Max Hold.
6. Select the max peak, and N DB DOWN=20dB.
7. Record the results.

Measurement Result:

For GFSK

Channel	20dB Bandwidth (KHz)		Conclusion
0	Fig.7	705.128	P
39	Fig.8	698.718	P
78	Fig.9	692.306	P

Conclusion: PASS

Test graphs as below:

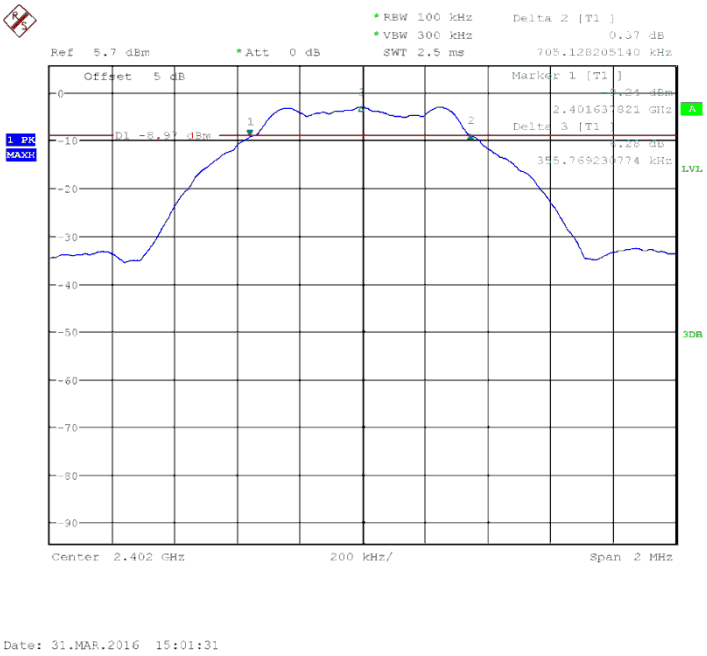


Fig.7 6dB Bandwidth: Ch0

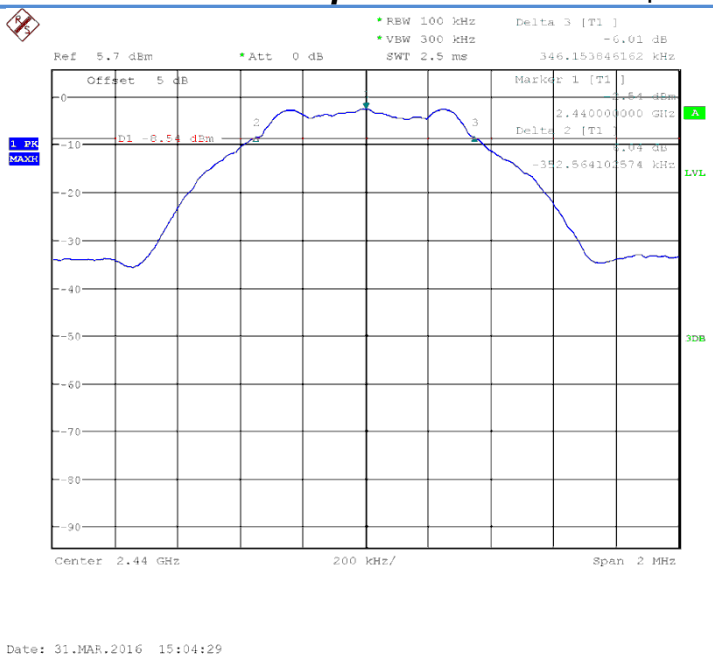


Fig.8 6dB Bandwidth: Ch19

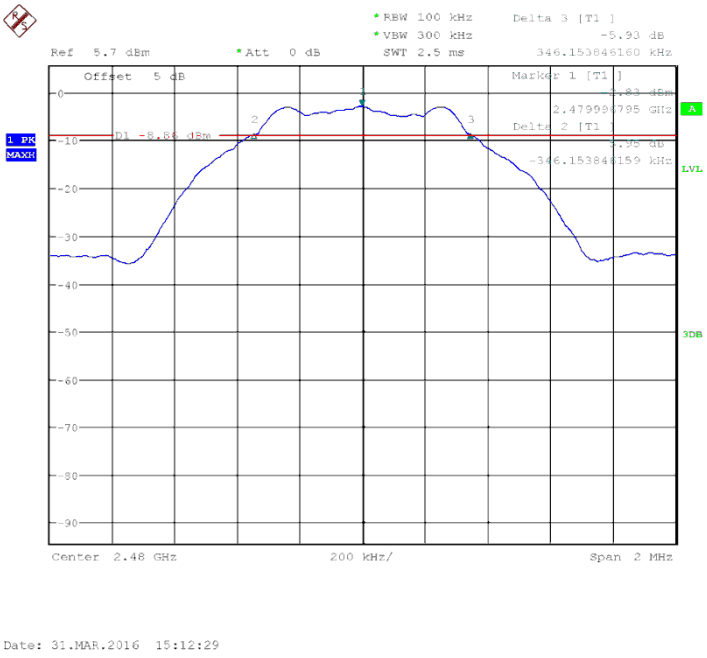


Fig.9 6dB Bandwidth: Ch39

6.4. Frequency Band Edges-Conducted

6.4.1 Measurement Limit:

Standard	Limited(dBc)
FCC 47 CFR Part 15.247(d)	>20

6.4.2 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.6.

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz, span more than 1.5 times channel bandwidth (2MHz).
3. Detector =peak, sweep time=auto couple, trace mode=max hold.
4. Allow sweep to continue until the trace stabilizes.

6.4.3 Measurement results

For GFSK

Channel	Band Edge Power (dBc)	Conclusion
00	Fig.10	P
39	Fig.11	P

Conclusion: PASS

Test graphs an below

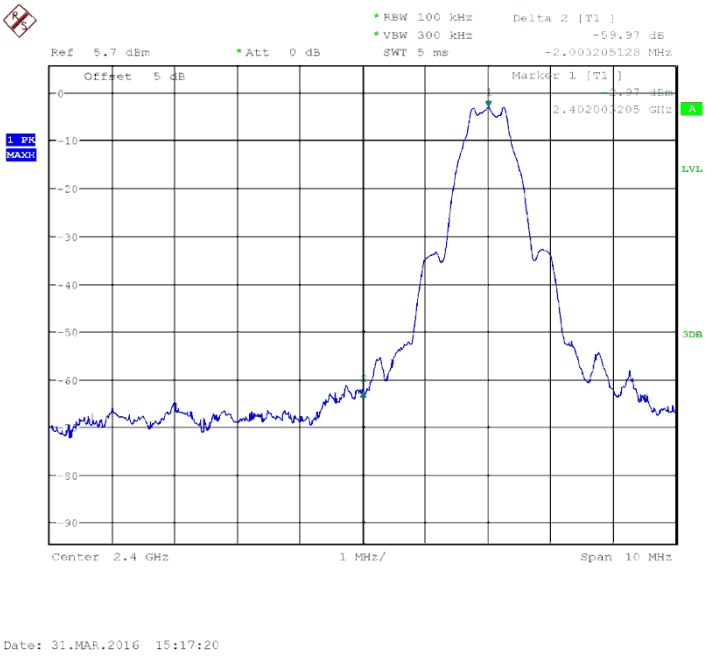


Fig.10 Frequency Band Edge: GFSK, Ch0, Hopping OFF

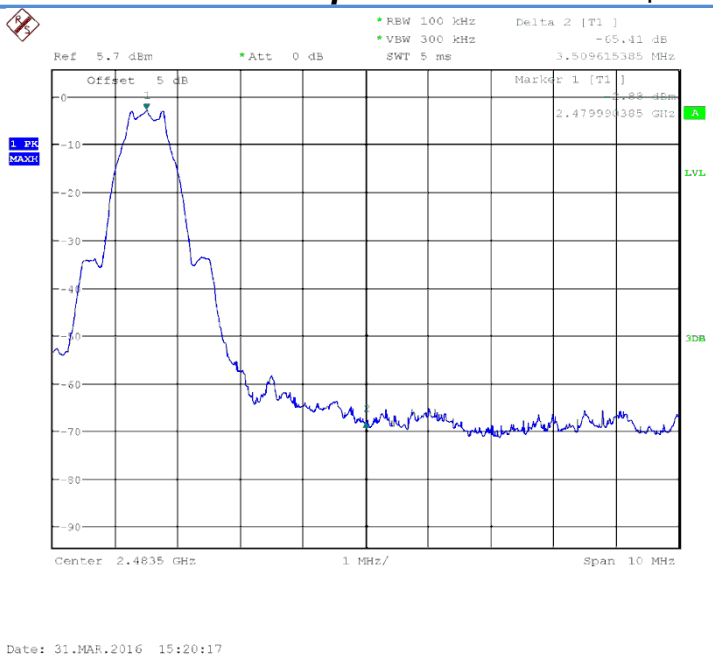


Fig.11 Frequency Band Edge: GFSK, Ch0, Hopping ON

6.5. Conducted Emission

6.5.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part15.247 (d)	20dB below peak output power in 100KHz bandwidth

6.5.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.8.

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz.
3. Detector =peak, sweep time=auto couple, trace mode=max hold.

6.5.3 Measurement Results:

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	Center Freq.	Fig.12	P
	30MHz~26GHz	Fig.13	P
Ch19 2440MHz	Center Freq.	Fig.14	P
	30MHz~26GHz	Fig.15	P
Ch39 2480MHz	Center Freq.	Fig.16	P

	30MHz~26GHz	Fig.17	P

Conclusion: PASS

Test graphs as below

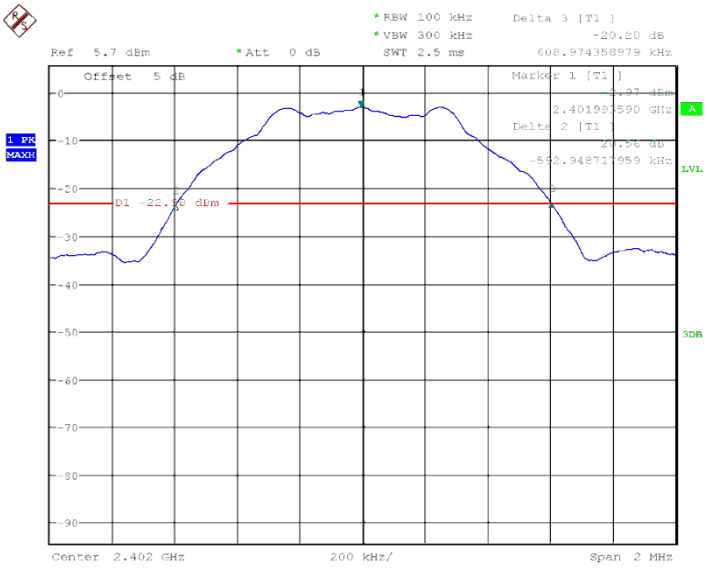


Fig.12 Conducted spurious emission: Ch0, 2402MHz

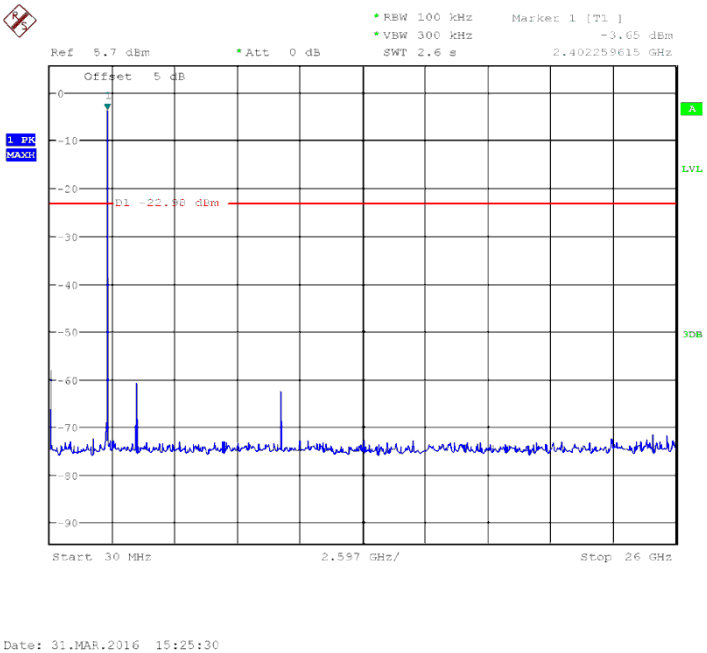


Fig.13 Conducted spurious emission: Ch0, 30MHz~26GHz

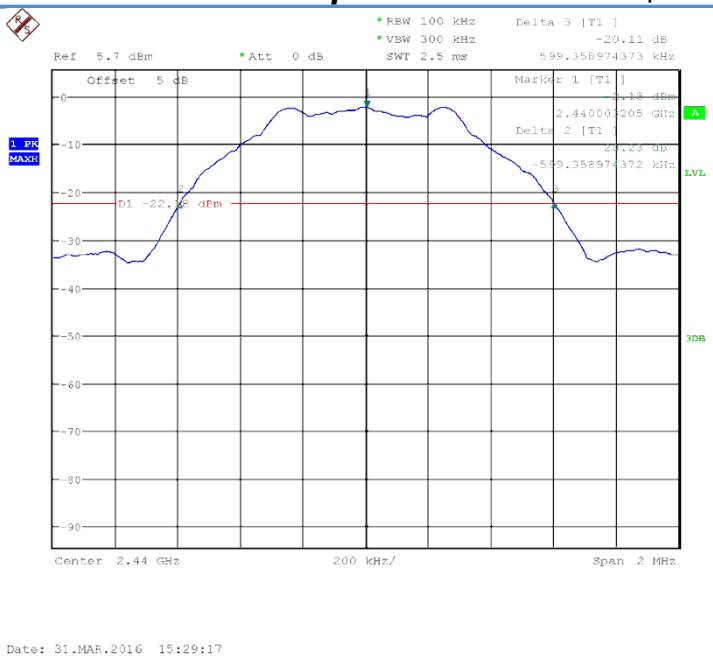


Fig.14 Conducted spurious emission: Ch19, 2441MHz

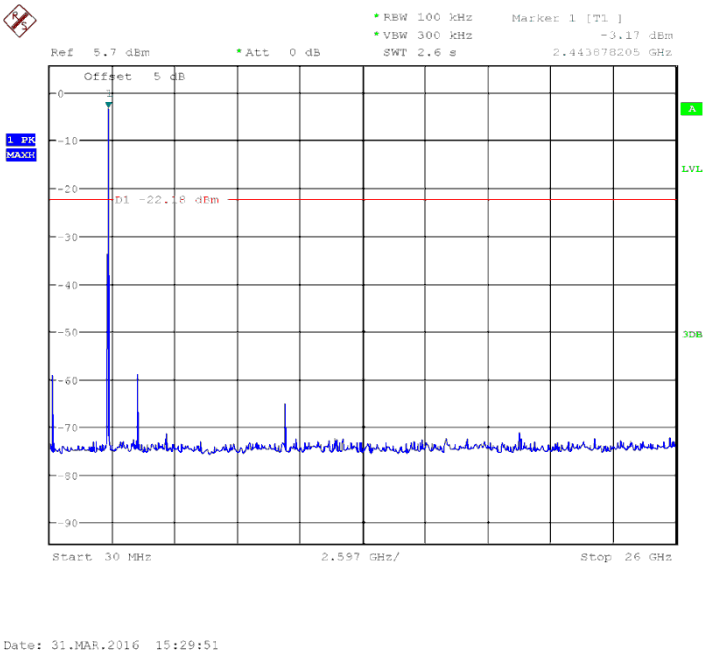


Fig.15 Conducted spurious emission: Ch19, 30MHz~26GHz

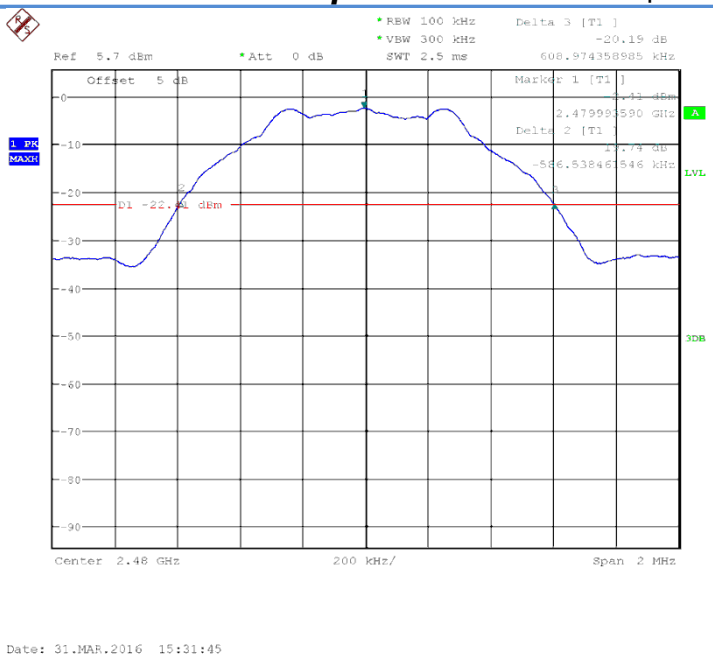


Fig.16 Conducted spurious emission: Ch39, 2480MHz

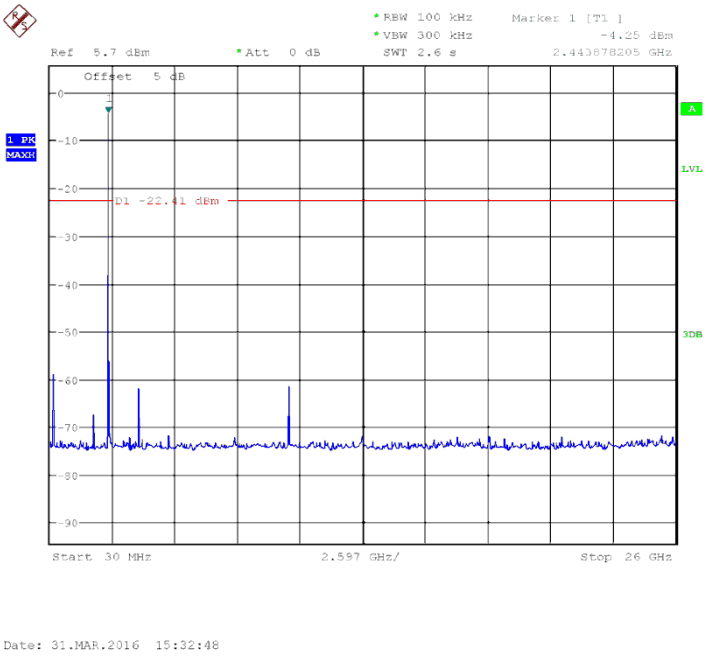


Fig.17 Conducted spurious emission: Ch39, 30MHz~26GHz

6.6. Radiated Emission

6.6.1 Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a),

must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

6.6.2 Test Method

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2009 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30~1000	100KHz/300KHz	5
1000~4000	1MHz/1MHz	15
4000~18000	1MHz/1MHz	40
18000~26500	1MHz/1MHz	20

6.6.3 Measurement Results:

A “reference path loss” is established and A_{Rpi} is the attenuation of “reference path loss”, and including the gain of receive antenna , the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

A_{Rpi} = Cable loss + Antenna Gain-Preamplifier gain

Result=P_{Mea} + A_{Rpi}

Channel	Frequency Range	Test Results	Conclusion
Ch0 2402MHz	30MH~1GHz	Fig.18	P
	1GHz~3GHz	Fig.19	P
	3GHz~18GHz	Fig.20	P
Power	2.38GHz~2.4GHz	Fig.21	P
Power	2.45GHz~2.5GHz	Fig.22	P

Channel	Frequency Range	Test Results	Conclusion
Ch0 2480MHz	30MH~1GHz	Fig.23	P
	1GHz~3GHz	Fig.24	P
	3GHz~18GHz	Fig.25	P
All channels	18GHz~26GHz	Fig.26	P

Ch0 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
51.608772	29.95	-25	54.95	V
66.590096	31.22	-27.2	58.42	V
73.91922	36.19	-28.2	64.39	V
75.302364	36.22	-28.2	64.42	V
279.877576	34.65	-21.1	55.75	H
557.578848	38.2	-13.2	51.4	H

Ch0 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
1996.0612	53.42	2.5	50.92	H
2662.920576	55.53	10	45.53	H
2788.448077	52.94	10.3	42.64	H

2821.346154	53.25	10.6	42.65	H
2904.577692	53.96	11.3	42.66	H
2967.925192	53.61	11.4	42.21	V

Ch0 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
15368.79	56.31	22.8	33.51	H
15820.652	57.88	24.7	33.18	H
16494.08253	58.64	26.9	31.74	V
16891.85733	60.03	27.1	32.93	H
17518.7006	61.82	29.2	32.62	V
17980.87733	62.33	30.1	32.23	H

Ch39 30MHz-1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
34.452684	20.59	-25.9	46.49	V
51.590684	29.95	-25	54.95	V
65.488968	31.76	-26.9	58.66	V
75.157408	34.79	-28.2	62.99	V
479.3724	25.9	-15.3	41.2	H
559.860908	37.78	-13.1	50.88	H

Ch39 1GHz-3GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2193.0412	49.34	5	44.34	H
2662.080384	56.45	10	46.45	H
2740.048654	53.03	10.1	42.93	V
2802.678269	53.21	10.4	42.81	H
2901.711346	54.31	11.3	43.01	H

2998.158654	54.12	11.8	42.32	H

Ch39 3GHz-18GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
15831.54567	57.85	24.7	33.15	H
16213.46507	59.03	25.6	33.43	V
16794.5614	59.83	27.3	32.53	H
17329.54413	61.43	28.4	33.03	V
17660.29567	62.02	28.9	33.12	H
17972.67233	63.04	30	33.04	H

All Ch 18GHz~26.5GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
19525.786000	49.0	6.97	42.03	V
20684.980000	47.7	6.97	40.73	H
22119.789000	45.3	3.05	42.05	V
23627.899000	43.8	3.05	40.75	H
24606.319000	43.4	3.05	40.35	V
25244.558000	43.6	3.05	40.55	H

Note: all the test data shown was peak detected.

Conclusion: PASS

Test graphs as below:

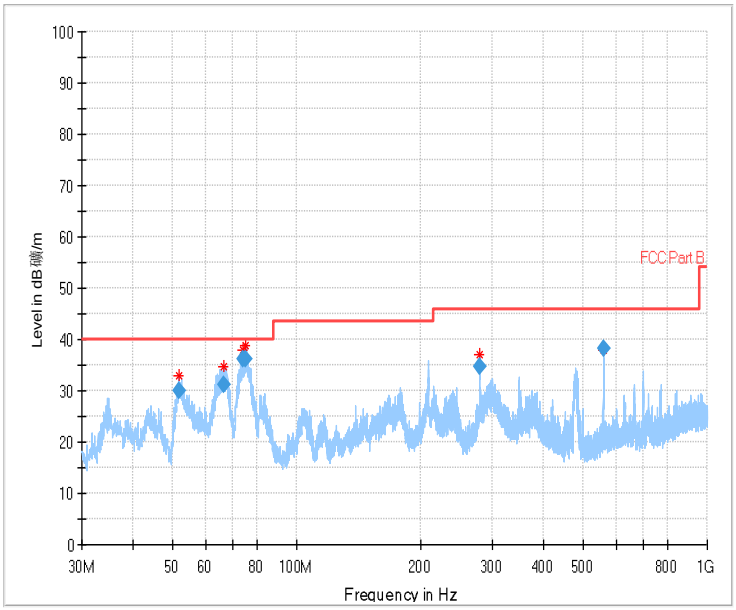


Fig.18 Radiated emission: Ch0, 30MHz~1GHz

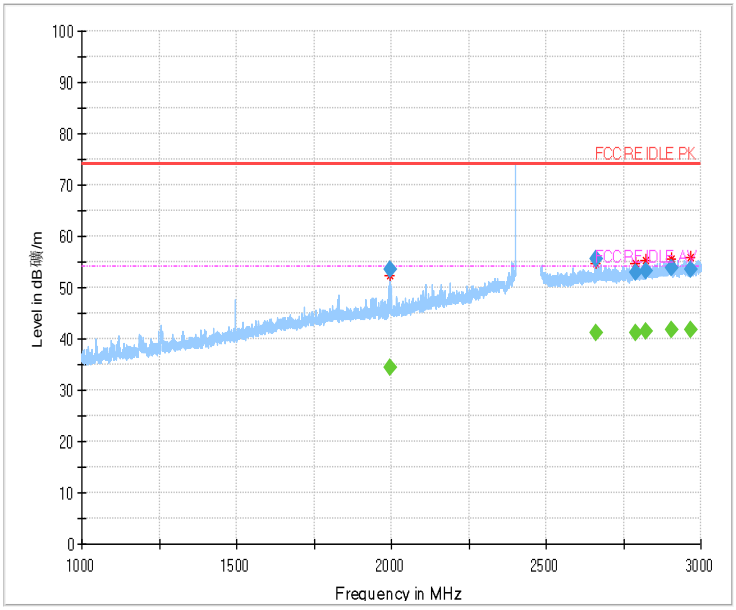


Fig.19 Radiated emission: Ch0, 1GHz~3GHz

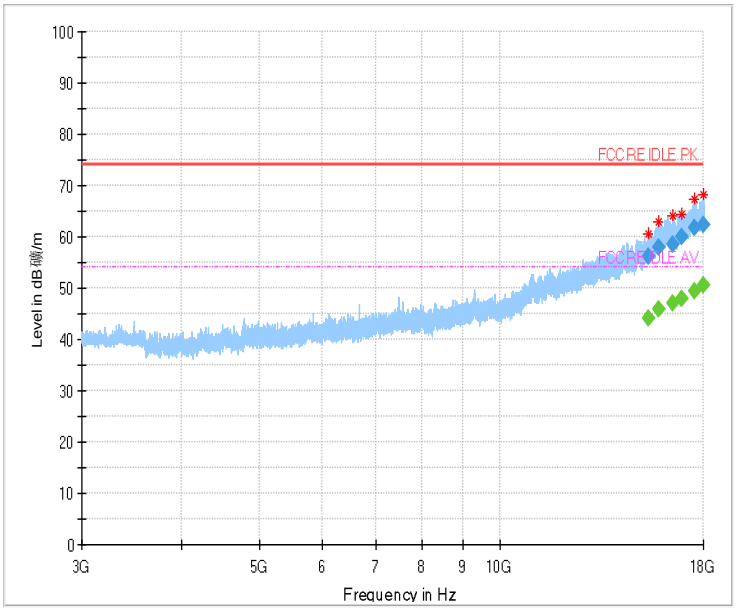


Fig.20 Radiated emission: Ch0, 3GHz~18GHz

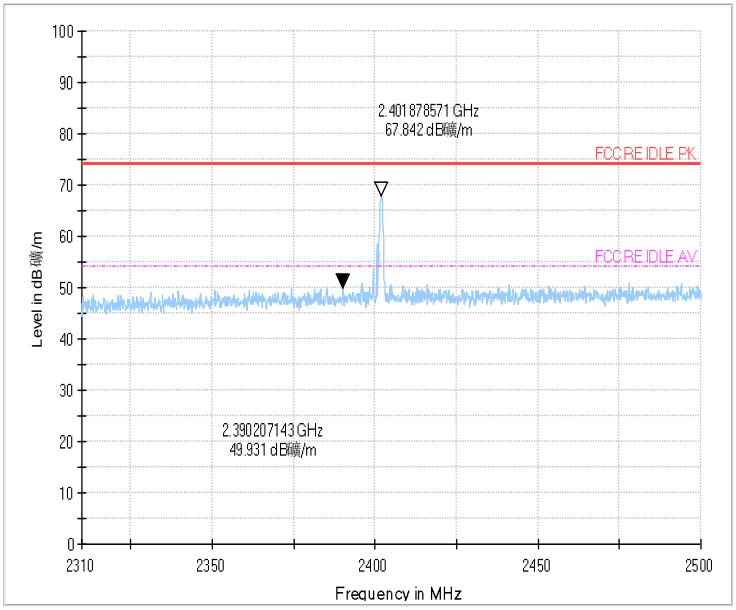
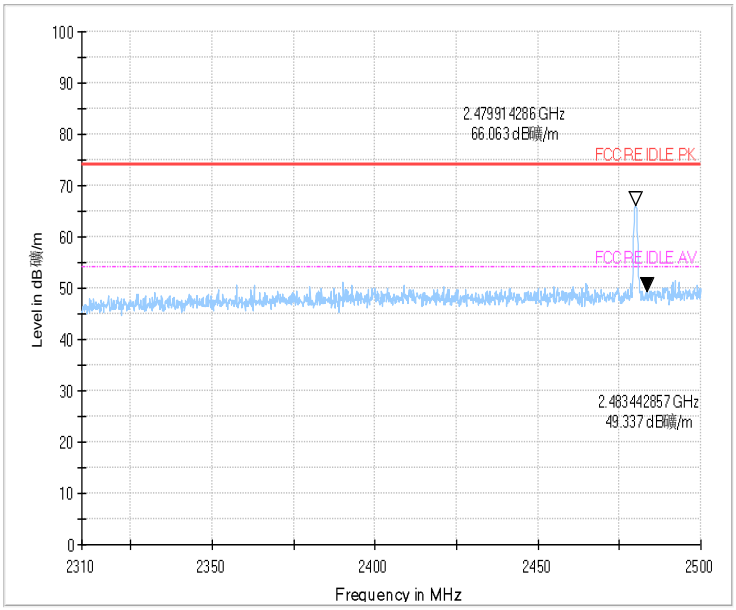


Fig.21 Radiated emission (Power): low channel



(peak)

Fig.22 Radiated emission (Power): high channel

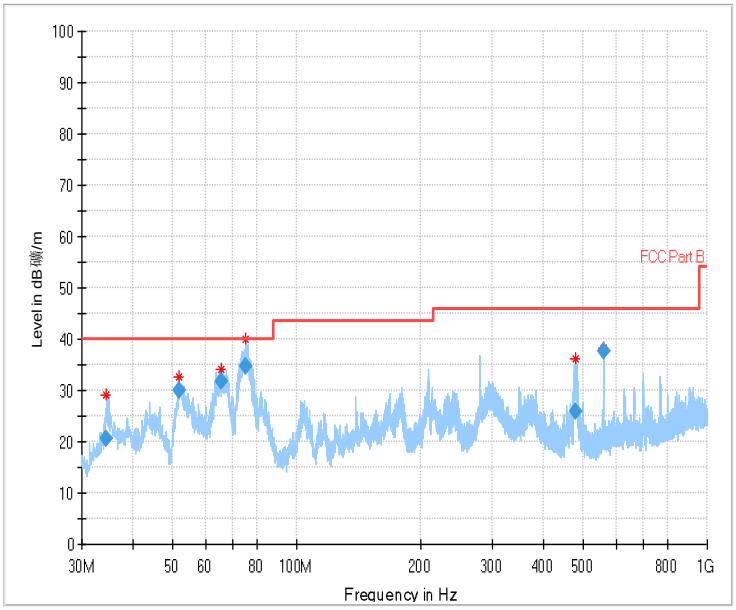


Fig.23 Radiated emission: Ch39, 30MHz~1GHz

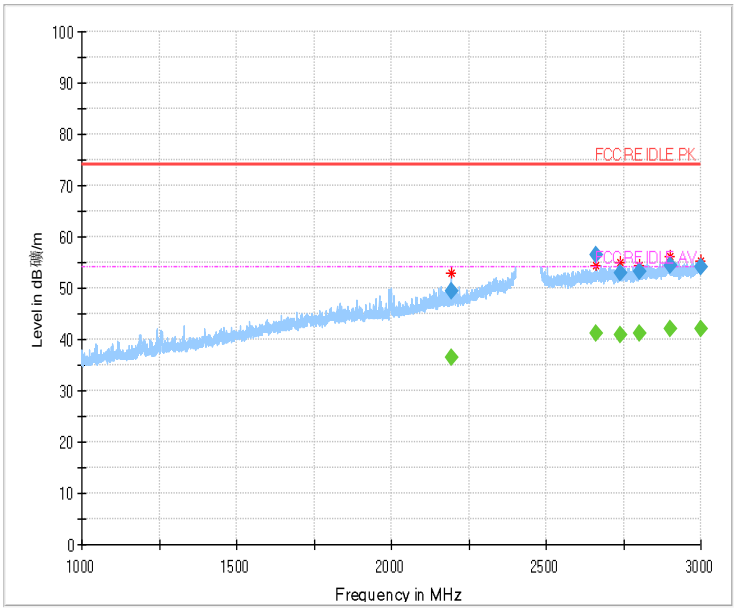


Fig.24 Radiated emission: Ch39, 1GHz~3GHz

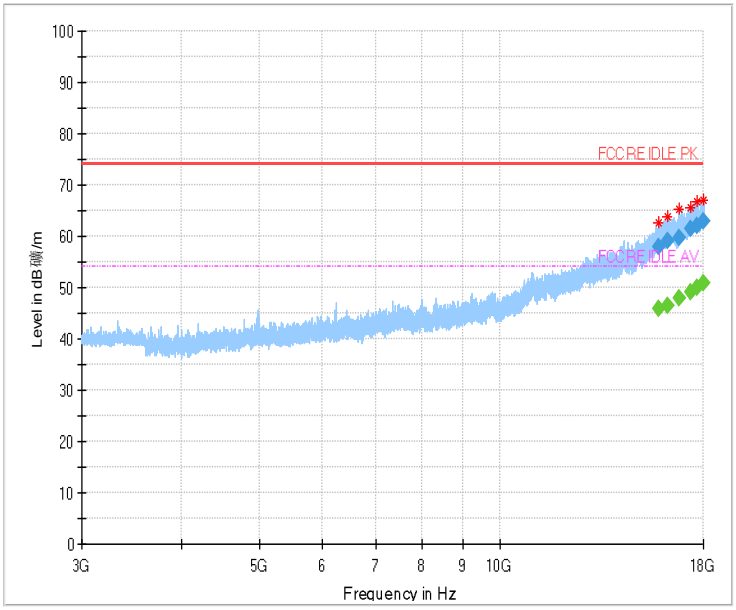


Fig.25 Radiated emission: Ch39, 3GHz~18GHz

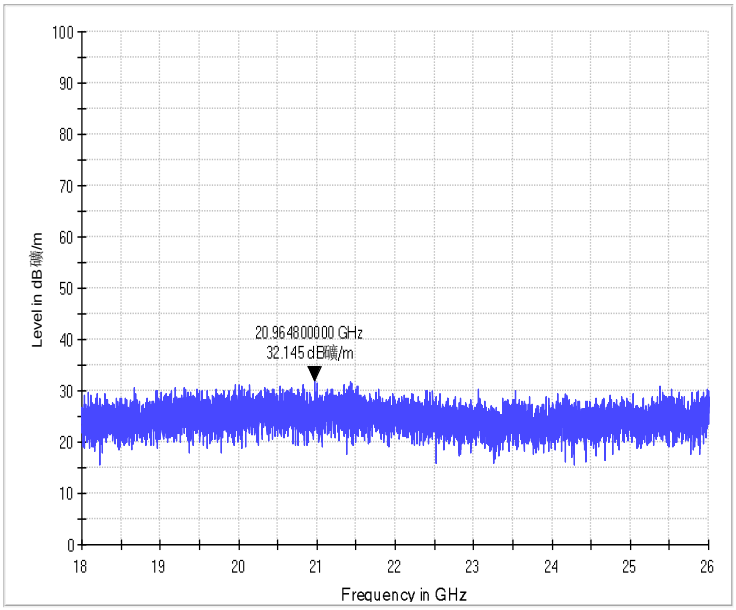


Fig.26 Radiated emission: 18 GHz - 26 GHz

7. Test Equipments and Ancillaries Used For Tests

The test equipments and ancillaries used are as follows.

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Cal.interval
1	Vector Signal Analyser	FSQ26	101096	Rohde&Schwarz	2015-05-13	1
2	Bluetooth Tester	CBT32	100785	Rohde&Schwarz	2015-05-13	1
3	DC Power Supply	ZUP60-14	LOC-220Z006-0007	TDL-Lambda	2015-05-13	1

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Cal.interval
1	Universal Radio Communicati	CMU200	123126	R&S	2015-05-13	1
2	Test Receiver	ESU40	100307	R&S	2015-05-13	1
3	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2014-11-05	3
4	Double Ridged Guide Antenna	ETS-3117	00135885	ETS	2014-05-06	3
5	2-Line V-Network	ENV216	101380	R&S	2015-05-13	1

Anechoic chamber

Fully anechoic chamber by Frankonia German.

8. Test Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Fully-anechoic chamber2 (Tapered Section: 8.75 meters×3.66 meters×3.66 meters, Rectangular Section: 7.32 meters×3.97 meters×3.66 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃

Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 30MHz to 40000MHz

ANNEX A. Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

************End The Report************