

FCC Test Report

: VTV-RFBHS FCC ID

Equipment : BT module

Model No. : RF-BHS

Brand Name : TSC

Applicant : TSC Auto ID Technology Co., Ltd.

Address : 9F., No. 95, Minquan Rd. Xindian Dist. New

Taipei City 23141, Taiwan

: 47 CFR FCC Part 15.247 Standard

Received Date : Jan. 13, 2015

Tested Date : Jan. 14 ~ Jan. 22, 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:

Testing Laboratory

Page: 1 of 33

Report No.: FR511301AE



Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information	
1.2	Local Support Equipment List	
1.3	Test Setup Chart	
1.4	Test Equipment List and Calibration Data	
1.5	Test Standards	
1.6	Measurement Uncertainty	g
2	TEST CONFIGURATION	10
2.1	Testing Condition	10
2.2	The Worst Test Modes and Channel Details	
3	TRANSMITTER TEST RESULTS	11
3.1	Conducted Emissions	11
3.2	6dB and Occupied Bandwidth	14
3.3	RF Output Power	17
3.4	Power Spectral Density	19
3.5	Emissions in Restricted Frequency Bands	21
3.6	Emissions in non-restricted Frequency Bands	31
4	TEST LABORATORY INFORMATION	33



Release Record

Report No.	Version	Description	Issued Date
FR511301AE	Rev. 01	Initial issue	Feb. 03, 2015

Report No.: FR511301AE Page: 3 of 33



Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 0.442MHz 34.08 (Margin -12.95dB) - AV	Pass
15.247(d)	Radiated Emissions	[dBuV/m at 3m]: 191.99MHz	Pass
15.209	Nadiated Emissions	39.72 (Margin -3.78dB) - PK	F a 5 5
15.247(b)(3)	Maximum Output Power	Power [dBm]: 3.81	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

Report No.: FR511301AE Page: 4 of 33



1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information							
Frequency Range (MHz) Bluetooth Ch. Freq. (MHz) Channel Number Data Rate							
2400-2483.5 V4.0 LE 2402-2480 0-39 [40] 1 Mbps							
Note 1: Bluetooth LE (Low energy) uses GFSK modulation.							

1.1.2 Antenna Details

Ant. No.	Туре	Gain (dBi)	Connector	Remark
1	Chip	1		

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc from host

1.1.4 Accessories

N/A

Report No.: FR511301AE Page: 5 of 33



1.1.5 Channel List

	Frequency band (MHz)				2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
37	2402	9	2422	18	2442	28	2462	
0	2404	10	2424	19	2444	29	2464	
1	2406	38	2426	20	2446	30	2466	
2	2408	11	2428	21	2448	31	2468	
3	2410	12	2430	22	2450	32	2470	
4	2412	13	2432	23	2452	33	2472	
5	2414	14	2434	24	2454	34	2474	
6	2416	15	2436	25	2456	35	2476	
7	2418	16	2438	26	2458	36	2478	
8	2420	17	2440	27	2460	39	2480	

1.1.6 Test Tool and Duty Cycle

Test tool ISRT, version: 2.1.25.4249	
Duty cycle of test signal (%)	67.76%
Duty Factor (dB)	1.69

1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)			
Modulation Mode	2402	2440	2480	
GFSK/1Mbps	0x7F	0x7F	0x7F	

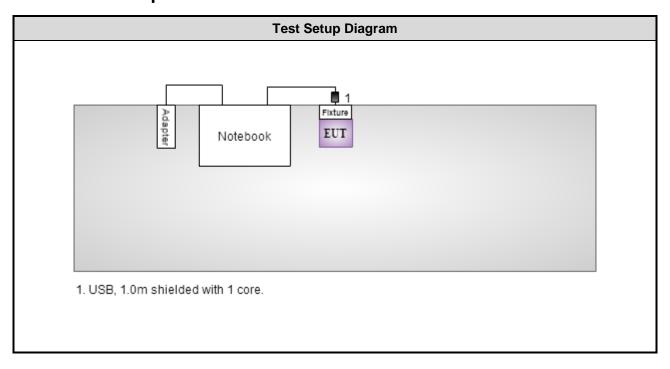
Report No.: FR511301AE Page: 6 of 33



1.2 Local Support Equipment List

	Support Equipment List						
No.	No. Equipment Brand Model FCC ID Signal cable / Length (m)						
1	Notebook	DELL	Latitude E6430	DoC	USB, 1.0m shielded with 1 core.		

1.3 Test Setup Chart



Report No.: FR511301AE Page: 7 of 33



1.4 Test Equipment List and Calibration Data

Test Item	Conducted Emission	Conducted Emission								
Test Site	Conduction room 1 / (Conduction room 1 / (CO01-WS)								
Instrument	Manufacturer	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					
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Nov. 26, 2014	Nov. 25, 2015					
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 31, 2014	Dec. 30, 2015					
50 ohm terminal (Support Unit)	NA	50	04	Apr. 18, 2014	Apr. 17, 2015					
Measurement Software	AUDIX	e3	6.120210k	NA	NA					
Note: Calibration Interval of instruments listed above is one year.										

Test Item	Radiated Emission					
Test Site	966 chamber1 / (03Ch	H01-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	
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 11, 2014	Dec. 10, 2015	
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 10, 2014	Nov. 09, 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 Inter	rval of instruments listed	d above is one year.				

Test Item	RF Conducted				
Test Site	(TH01-WS)	(TH01-WS)			
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Feb. 17, 2014	Feb. 16, 2015
Power Meter	Anritsu	ML2495A	1241002	Sep. 29, 2014	Sep. 28, 2015
Power Sensor	Anritsu	MA2411B	1207366	Sep. 29, 2014	Sep. 28, 2015
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Report No.: FR511301AE Page: 8 of 33



1.5 Test Standards

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

47 CFR FCC Part 15.247 ANSI C63.10-2013 FCC KDB 558074 D01 DTS Meas Guidance v03r02

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		
Conducted power	±0.808 dB		
Power density	±0.463 dB		
Conducted emission	±2.670 dB		
AC conducted emission	±2.92 dB		
Radiated emission ≤ 1GHz	±3.72 dB		
Radiated emission > 1GHz	±5.65 dB		

Report No.: FR511301AE Page: 9 of 33



2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	18°C / 82%	Peter Lin
Radiated Emissions	03CH01-WS	20-23°C / 65%	Morgan Chen Lance Xiao
RF Conducted	TH01-WS	24°C / 64%	Felix Sung

FCC site registration No.: 657002IC site registration No.: 10807A-1

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate (Mbps)	Test Configuration
AC Power Line Conducted Emissions	BT LE	2402	1Mbps	
Radiated Emissions ≤ 1GHz	BT LE	2402	1Mbps	
Radiated Emissions > 1GHz	BT LE	2402, 2440, 2480	1Mbps	
Maximum Output Power				
6dB bandwidth	BT LE	2402, 2440, 2480	1Mbps	
Power spectral density				

NOTE: 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.

Report No.: FR511301AE Page: 10 of 33



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



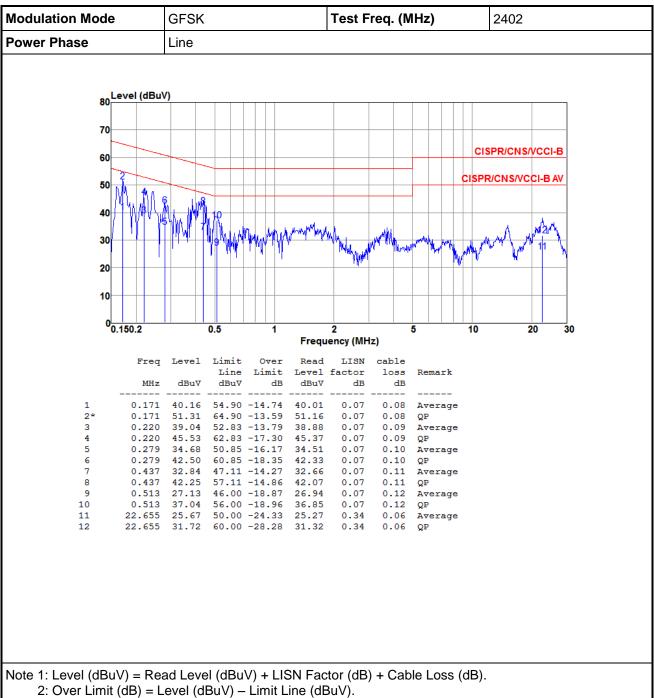
Note: 1. Support units were connected to second LISN.

Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

Report No.: FR511301AE Page: 11 of 33

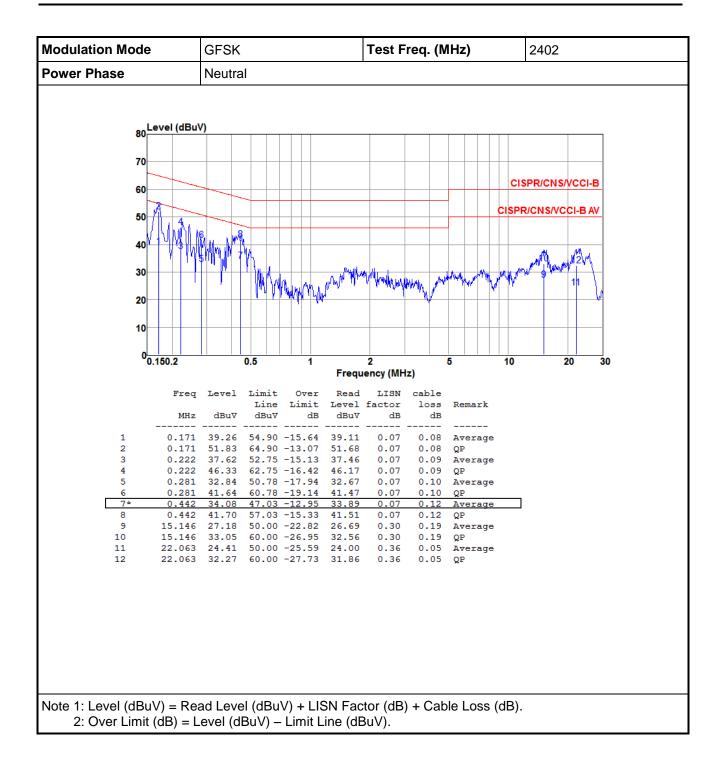


Test Result of Conducted Emissions 3.1.4



Report No.: FR511301AE Page: 12 of 33





Report No.: FR511301AE Page: 13 of 33



3.2 6dB and Occupied Bandwidth

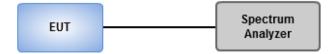
3.2.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

3.2.2 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 6dB relative to the maximum level measured in the fundamental emission.

3.2.3 Test Setup

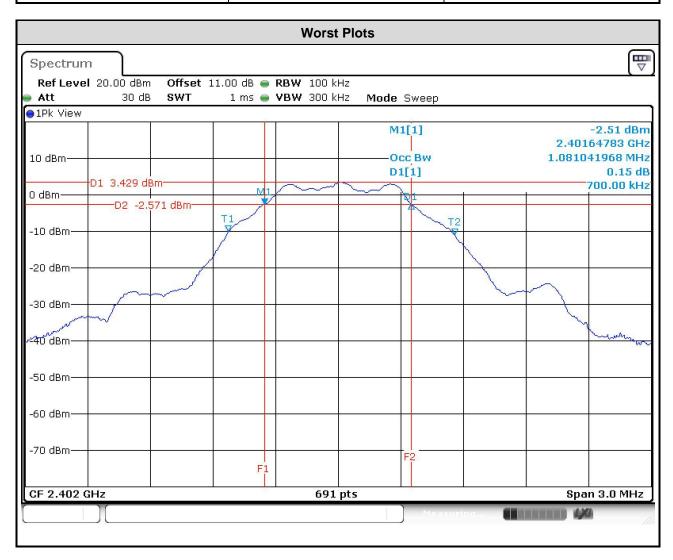


Report No.: FR511301AE Page: 14 of 33



3.2.4 Test Result of 6dB and Occupied Bandwidth

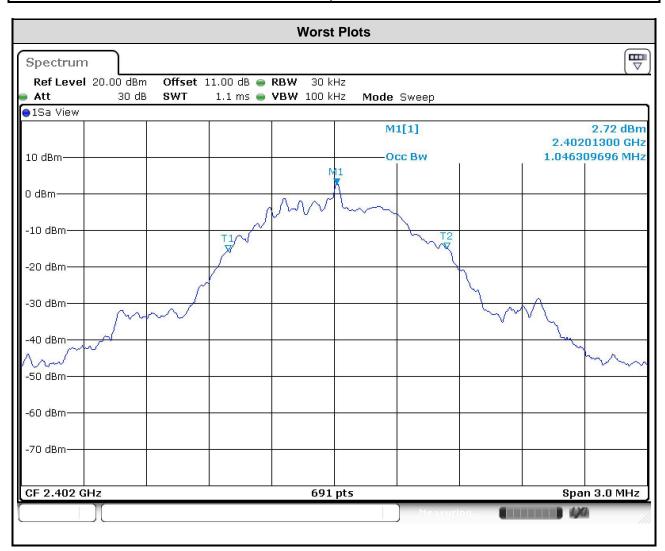
Freq. (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	
2402	700	500	
2440	700	500	
2480	700	500	



Report No.: FR511301AE Page: 15 of 33



Freq. (MHz)	99% Occupied Bandwidth (MHz)
2402	1.05
2440	1.04
2480	1.04



Report No.: FR511301AE Page: 16 of 33



3.3 RF Output Power

3.3.1 Limit of RF Output Power

Con	duct	ed power shall not exceed 1Watt.			
\boxtimes	Antenna gain <= 6dBi, no any corresponding reduction is in output power limit.				
	Ante	enna gain > 6dBi			
		Non Fixed, point to point operations. The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB			
		Fixed, point to point operations Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point Operations, maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.			
		Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations ,no any corresponding reduction is in transmitter peak output power			

3.3.2 Test Procedures

Maximum Peak Conducted Output Power

- 1. Set RBW = 1MHz, VBW = 3MHz, Detector = Peak.
- 2. Sweep time = auto, Trace mode = max hold, Allow trace to fully stabilize.
- 3. Use the spectrum analyzer channel power measurement function with the band limits set equal to the DTS bandwidth edges.

Nower meter

- A broadband Peak RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.
- Maximum Conducted Average Output Power (For reference only)

Nower meter

1. A broadband Average RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

3.3.3 Test Setup



Report No.: FR511301AE Page: 17 of 33



3.3.4 Test Result of Maximum Output Power

Freq. (MHz)	Peak Conducted Power (dBm)	Limit (dBm)
2402	3.81	30
2440	3.66	30
2480	3.08	30

Freq. (MHz)	Average Conducted Power (dBm)	Limit (dBm)
2402	3.41	30
2440	3.28	30
2480	2.62	30

Note: Average power is for reference only.

Report No.: FR511301AE Page: 18 of 33



3.4 Power Spectral Density

3.4.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.4.2 Test Procedures

- Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.
 - Set the RBW = 3kHz, VBW = 10kHz.
 - Detector = Peak, Sweep time = auto couple.
 - 3. Trace mode = max hold, allow trace to fully stabilize.
 - 4. Use the peak marker function to determine the maximum amplitude level.
- Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit.
 - Set the RBW = 100kHz, VBW = 300 kHz.
 - 2. Detector = RMS, Sweep time = auto couple.
 - 3. Set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (maximum data rate per stream).
 - 4. Perform the measurement over a single sweep.
 - 5. Use the peak marker function to determine the maximum amplitude level.\

3.4.3 Test Setup

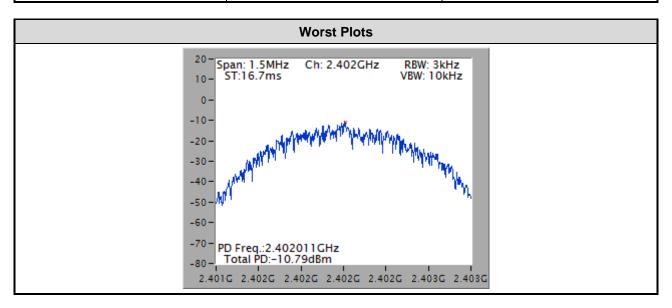


Report No.: FR511301AE Page: 19 of 33



3.4.4 Test Result of Power Spectral Density

Freq. (MHz)	Power Spectral Density (dBm / 3kHz)	Limit (dBm)	
2402	-10.79	8	
2440	-11.37	8	
2480	-11.89	8	



Report No.: FR511301AE Page: 20 of 33



3.5 Emissions in Restricted Frequency Bands

3.5.1 Limit of Emissions in Restricted Frequency Bands

Restricted Band Emissions Limit					
Frequency Range (MHz) Field Strength (uV/m) Field Streng		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.

3.5.2 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. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
- 2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
- RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

Report No.: FR511301AE Page: 21 of 33



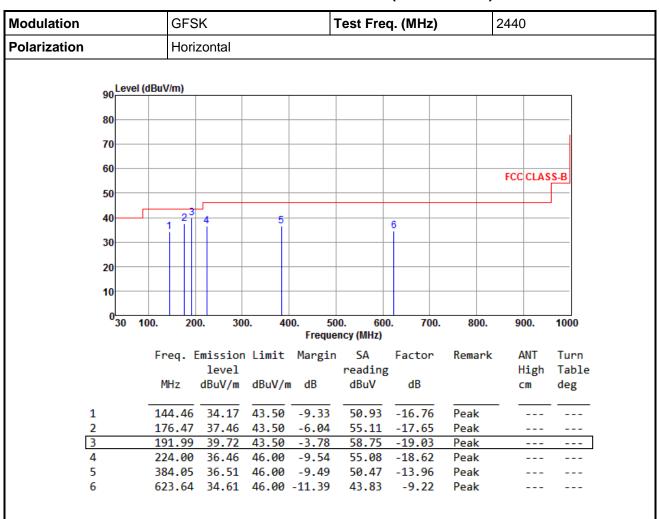
3.5.3 Test Setup



Report No.: FR511301AE Page: 22 of 33



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



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.

Report No.: FR511301AE Page: 23 of 33



Modulation	GFSK	Test Freq. (MHz)	2440
Polarization	Vertical		•
90 Level (dBu 80 70 60 50 40 30 1		6	FCC CLASS-B
0 30 100.	200. 300. 400.	500. 600. 700. 800.	. 900. 1000
F	req. Emission Limit Ma	requency(MHz) orgin SA Factor Remar	k ANT Turn
	level	reading	High Table
	MHz dBuV/m dBuV/m o	IB dBuV dB	cm deg
1 -	60.07 29.36 40.00 -10	0.64 46.43 -17.07 Peak	
	76.47 32.53 43.50 -10		
	91.99 34.75 43.50 -8		
	08.48 33.16 43.50 -10		
5 3	35.55 30.34 46.00 -15		
	98.24 34.35 46.00 -11	.65 41.06 -6.71 Peak	

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

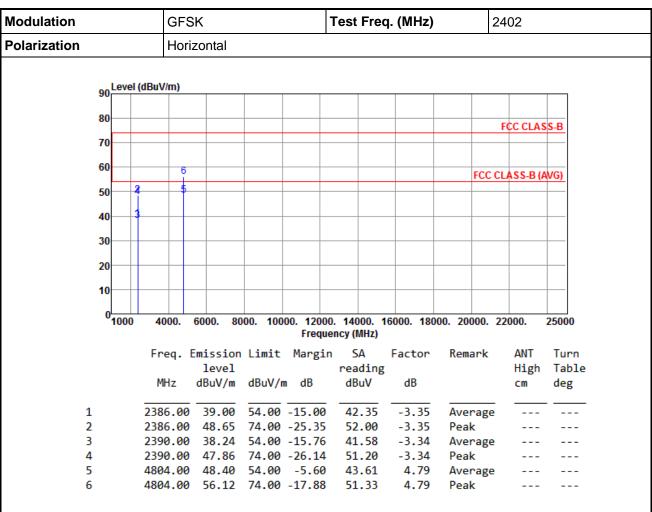
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Report No.: FR511301AE Page: 24 of 33



3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for GFSK



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).

Report No.: FR511301AE Page: 25 of 33



3

4

5

6

Modulation			GFS	GFSK					Test Freq. (MHz)					
Polarization			Vert	ical			•				•			
	90	Level	(dBuV/m)											
	80													
	00										F	CC CLAS	S-B	
	70													
	60													
		Щ,	6								FCC CL	ASS-B (A	WG)	
	50	- 9	5											
	40	- 3												
	30													
	20													
	10													
	10													
	0	1000	4000.	6000. 80	000. 100		00. 1400 Jency (M		5000. 180	00. 200	000. 22	000.	25000	
			Frea.	Emission	Limit	Margi	n SA	1	Factor	Rema	ark	ANT	Turn	
			q.	level		63	read					High	Tabl	
			MHz	dBuV/m	dBuV/ı	n dB	dBu	_	dB			cm	deg	
	1		2386.00	35 06	54 00	19 0/	- 30	21	-3.35	Δια				
	1 2		2386.00						-3.35	Aver Peal	_			
	_		2500.00	40.72	74.00	25.20	, ,,,	0,		. car				

2390.00 36.70 54.00 -17.30 40.04

4804.00 44.72 54.00 -9.28 39.93 4804.00 53.20 74.00 -20.80 48.41

2390.00 49.00 74.00 -25.00

Average

Average

Peak

Peak

-3.34

-3.34

4.79

4.79

52.34

39.93

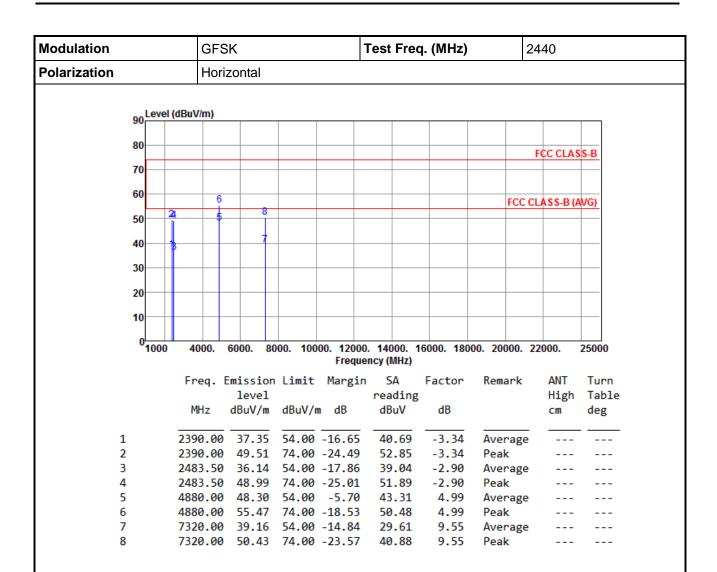
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Report No.: FR511301AE Page: 26 of 33





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).

Report No.: FR511301AE Page: 27 of 33



2

3

4

5

6

7

8

Modulation		GFS	SK			Test Fre	q. (MHz)	:	2440	
Polarization		Vert	ical							
	90 Level	(dBuV/m)								
	80									
	70								FCC CLAS	S-B
	70									
	60							FCC	CLASS-B (A	WG)
	50	24	8							
	40		1							
	30									
	20									_
	10									
	0									
	~1000	4000.	6000. 80	00. 100		0. 14000. 1 ency (MHz)	16000. 180	00. 20000.	22000.	25000
		Freq. I	Emission	Limit	Margir	n SA	Factor	Remark	ANT	Turn
			level			reading			High	Table
		MHz	dBuV/m	dBuV/n	n dB	dBuV	dB		cm	deg
	1	2390.00	37.05	54.00	-16.95	40.39	-3.34	Average		
	_									

52.59

39.90

52.06

38.64

46.96

29.26

-3.34

-2.90

-2.90

4.99

4.99

9.55

9.55

Peak

Peak

Peak

Peak

Average

Average

Average

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

2390.00 49.25 74.00 -24.75

2483.50 37.00 54.00 -17.00

2483.50 49.16 74.00 -24.84

4880.00 43.63 54.00 -10.37

4880.00 51.95 74.00 -22.05

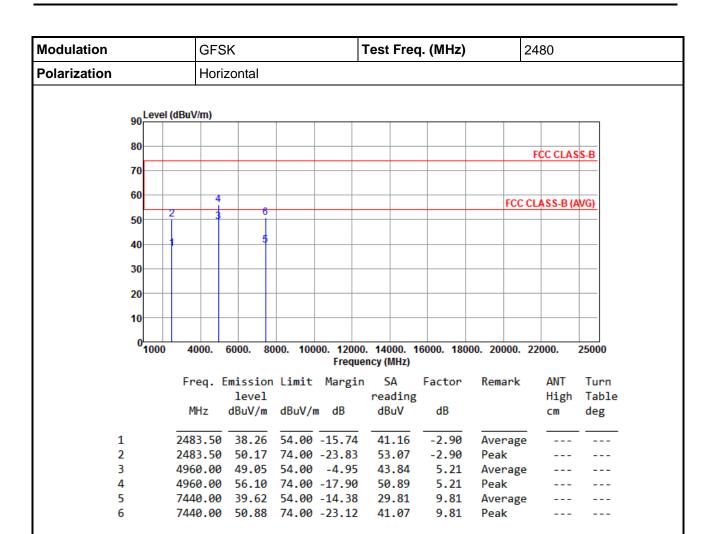
7320.00 38.81 54.00 -15.19

7320.00 50.83 74.00 -23.17 41.28

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Report No.: FR511301AE Page: 28 of 33





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).

Report No.: FR511301AE Page: 29 of 33



Modulation			GF:	SK				Test	Freq	դ. (MHz)		24	80	
Polarization		Ver	ical			1					,			
	90	Level	(dBuV/m)											
	80													
	70											F	CC CLAS	S-B
	70													
	60											FCC CL	ASS-B (A	WG)
	50	- 2	2 1		6								,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
] 3		5									
	40													
	30													
	20													
	10													
	0	1000	4000.	6000.	8000	. 100	00. 1200 Frequ			6000. 180	000. 200	000. 22	000.	25000
			Frea.	Emissi	on L	imit	Margi		Α	Factor	Rema	ark	ANT	Turn
				leve					ding				High	Table
			MHz	dBuV/	m d	BuV/n	n dB	dB	uV	dB			cm	deg
1	L		2483.50	37.6	7 5	4.00	-16.33	40	.57	-2.90	Avei	rage		
2			2483.50				-24.02		.88	-2.90	Peal	_		
3			4960.00				-10.03		.76	5.21		rage		
4			4960.00 7440.00						.06	5.21				
9			7440.00						.61	9.81 9.81	Peal	rage k		

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).

Report No.: FR511301AE Page: 30 of 33



3.6 Emissions in non-restricted Frequency Bands

3.6.1 Emissions in non-restricted frequency bands limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz

3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

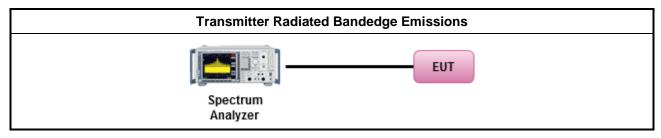
Reference level measurement

- 1. Set RBW=100kHz, VBW = 300kHz, Detector = Peak, Sweep time = Auto
- 2. Trace = max hold, Allow Trace to fully stabilize
- 3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

- 1. Set RBW=100kHz, VBW = 300kHz, Detector = Peak, Sweep time = Auto
- 2. Trace = max hold, Allow Trace to fully stabilize
- 3. Scan Frequency range is up to 25GHz
- 4. Use the peak marker function to determine the maximum amplitude level

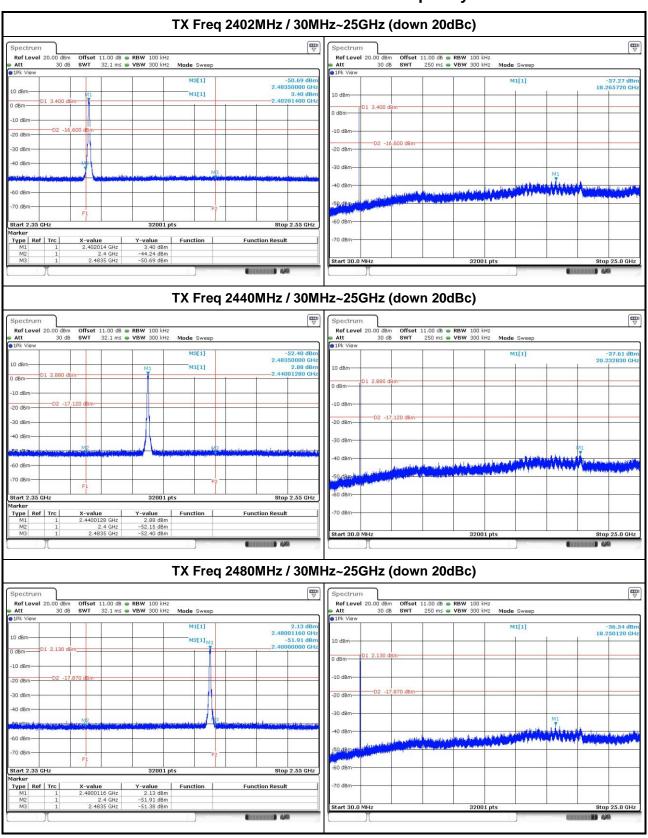
3.6.4 Test Setup



Report No.: FR511301AE Page: 31 of 33



3.6.5 Test Result of Emissions in non-restricted Frequency Bands



Report No.: FR511301AE Page: 32 of 33



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

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan,

R.O.C.

Kwei Shan

Tel: 886-3-271-8666 No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C. Kwei Shan Site II

Tel: 886-3-271-8640

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

==END==

Report No.: FR511301AE Page: 33 of 33