

FCC Test Report

FCC ID : 2ACAHAC01

Equipment : AudioClip

: AC1A, AC1B Model No.

(Please refer to section 1.1.1 for more details)

Applicant : SBO Hearing A/S

Address : Kongebakken 9 DK-2765 Smoerum, Denmark

: 47 CFR FCC Part 15.247 Standard

Received Date : Sep. 04, 2017

Tested Date : Sep. 07 ~ Sep. 18, 2017

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.

Reviewed by: Approved by:

Along Chen / Assistant Manager Gary Chang / Manager **Testing Laboratory**

Report No.: FR790403AE Page: 1 of 33



Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information	5
1.2	Local Support Equipment List	
1.3	Test Setup Chart	
1.4	Test Equipment List and Calibration Data	
1.5	Test Standards	10
1.6	Measurement Uncertainty	10
2	TEST CONFIGURATION	11
2.1	Testing Condition	11
2.2	The Worst Test Modes and Channel Details	11
3	TRANSMITTER TEST RESULTS	12
3.1	Conducted Emissions	12
3.2	6dB and Occupied Bandwidth	15
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
FR790403AE	Rev. 01	Initial issue	Oct. 16, 2017

Report No.: FR790403AE Page: 3 of 33



Summary of Test Results

FCC Rules	Test Items	Measured	Result	
15.207	AC Power Line Conducted Emissions	[dBuV]: 0.564MHz 33.23 (Margin -12.77dB) - AV	Pass	
15.247(d)	Radiated Emissions	[dBuV/m at 3m]: 12010.00MHz	Pass	
15.209	Radiated Emissions	42.87 (Margin -11.13dB) - AV	F d 5 5	
15.247(b)(3)	Maximum Output Power Power [dBm]: 0.43		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.: FR790403AE Page: 4 of 33



1 General Description

1.1 Information

1.1.1 Product Details

The following models are provided to this EUT.

Model Name	Product Name	Description	
AC1A	AudiaClia	For different housing design.	
AC1B	AudioClip		

1.1.2 Specification of the Equipment under Test (EUT)

RF General Information						
Frequency Range (MHz)	Bluetooth Mode	Ch. Freq. (MHz)	Channel Number	Data Rate		
2400-2483.5	V4.2 LE	2402-2480	0-39 [40]	1 Mbps		
Note 1: Bluetooth LE	Note 1: Bluetooth LE (Low energy) uses GFSK modulation.					

1.1.3 Antenna Details

Ant. No.	Туре	Gain (dBi)	Connector	Remark
1	Inverted-F	5.8		

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from adapter 5Vdc from host 3.7Vec from battery
-------------------	--

Report No.: FR790403AE Page: 5 of 33



1.1.5 Accessories

	Accessories					
No.	Equipment	Description				
1	AC adapter	Brand: PHIHONG Model: AM05A-050A Power Rating: I/P: 100-240Vac, 50/60Hz, 0.2A O/P: 5Vdc, 1A Power Line: 1.8m non-shielded cable without core				
2	Battery	Brand: SYNERGY Model: AHB451730PC Power Rating: Rating: 3.7Vdc, 200mAh				
3	USB cable	1m shielded cable without core				

Report No.: FR790403AE Page: 6 of 33



1.1.6 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

1.1.7 Test Tool and Duty Cycle

Test tool NebulaDeveloper, Version: 3.2.0.0		
Duty cycle of test signal (%)	100.00%	
Duty Factor (dB)	0.00	

1.1.8 Power Setting

Modulation Mode	Test Frequency (MH		
Wodulation Wode	2402	2440	2480
GFSK/1Mbps	default	default	default

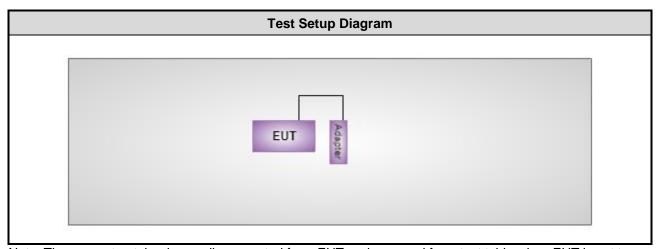
Report No.: FR790403AE Page: 7 of 33



1.2 Local Support Equipment List

Support Equipment List						
No. Equipment Brand Model FCC ID Signal cable / Length (
1	Notebook	DELL	Latitude E6430	DoC		

1.3 Test Setup Chart



Note: The support notebook was disconnected from EUT and removed from test table when EUT is set to transmit continuously.

Report No.: FR790403AE Page: 8 of 33



1.4 Test Equipment List and Calibration Data

Test Item	Conducted Emission	Conducted Emission					
Test Site	Conduction room 1 / (CO01-WS)					
Instrument	Manufacturer	Manufacturer Model No. Serial No. Calibration Date Calibration Until					
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017		
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 08, 2016	Nov. 07, 2017		
RF Cable-CON	EMC EMCCFD300-BM-B 50821 Dec. 20, 2016 Dec. 1						
Measurement Software AUDIX e3 6.120210k NA NA NA							
Note: Calibration Interval of instruments listed above is one year.							

Test Item	Radiated Emission					
Test Site	966 chamber 3 / (03C	H03-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until	
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101486	Nov. 15, 2016	Nov. 14, 2017	
Receiver	Agilent	N9038A	MY53290044	Oct. 06, 2016	Oct. 05, 2017	
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 28, 2017	Apr. 27, 2018	
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 09, 2017	Feb. 08, 2018	
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 25, 2016	Oct. 24, 2017	
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017	
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017	
Preamplifier	EMC	EMC02325	980187	Sep. 04, 2017	Sep. 03, 2018	
Preamplifier	Agilent	83017A	MY53270014	Aug. 21, 2017	Aug. 20, 2018	
Preamplifier	EMC	EMC184045B	980192	Aug. 22, 2017	Aug. 21, 2018	
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 04, 2017	Feb. 03, 2018	
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22600/4	Feb. 04, 2017	Feb. 03, 2018	
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 04, 2017	Feb. 03, 2018	
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800 -001	Feb. 04, 2017	Feb. 03, 2018	
LF cable-3M	EMC	EMC8D-NM-NM-300 0	131103	Feb. 04, 2017	Feb. 03, 2018	
LF cable-13M	EMC	EMC8D-NM-NM-130 00	131104	Feb. 04, 2017	Feb. 03, 2018	
Measurement Software	AUDIX	e3	6.120210g	NA	NA	
Note: Calibration Inter	val of instruments liste	d above is one year.				

Report No.: FR790403AE Page: 9 of 33



Test Item	RF Conducted					
Test Site	(TH01-WS)					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until	
Spectrum Analyzer	R&S	FSV40	101063	Mar. 15, 2017	Mar. 14, 2018	
Power Meter	Anritsu	ML2495A	1241002	Oct. 06, 2016	Oct. 05, 2017	
Power Sensor	Anritsu	MA2411B	1207366	Oct. 06, 2016	Oct. 05, 2017	
DC POWER SOURCE	GW INSTEK	GPC-6030D	EM892433	Oct. 20, 2016	Oct. 19, 2017	
AC POWER SOURCE	APC	AFC-500W	F312060012	Oct. 28, 2016	Oct. 27, 2017	
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA	
Note: Calibration Inter	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 15.247 ANSI C63.10-2013 FCC KDB 558074 D01 DTS Meas Guidance v04

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	±2.90 dB			
Radiated emission ≤ 1GHz	±3.66 dB			
Radiated emission > 1GHz	±5.37 dB			

Report No.: FR790403AE Page: 10 of 33



2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	23°C / 57%	Alex Huang
Radiated Emissions	03CH01-WS	24-25°C / 64-65%	Aska Huang Brand Wu
RF Conducted	TH01-WS	25°C / 65%	Felix Sung

FCC Designation No.: TW0009
 FCC site registration No.: 207696
 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 Radiated Emissions ≤ 1GHz	BT LE	2480	1Mbps	
Maximum Output Power 6dB bandwidth Power spectral density Radiated Emissions > 1GHz	BT LE	2402, 2440, 2480	1Mbps	

NOTE:

- The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement X, Y, and Z-plane. The Z-plane results were found as the worst case and were shown in this report.
- 2. S/N of test samples are as below 000016098300J2305570011 000016098300J2305570023 000016098300J2304263002
- **3.** Two models AC1A and AC1B had been covered during the pretest. The worst model is **AC1B**, and only its data was record in this test report.

Report No.: FR790403AE Page: 11 of 33



3 Transmitter Test Results

3.1 Conducted Emissions

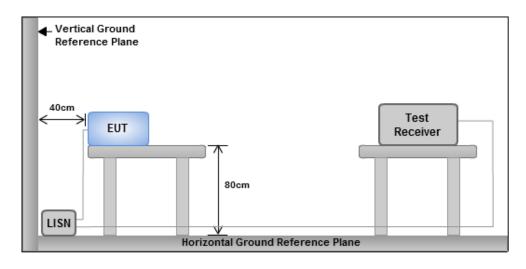
3.1.1 Limit of Conducted Emissions

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



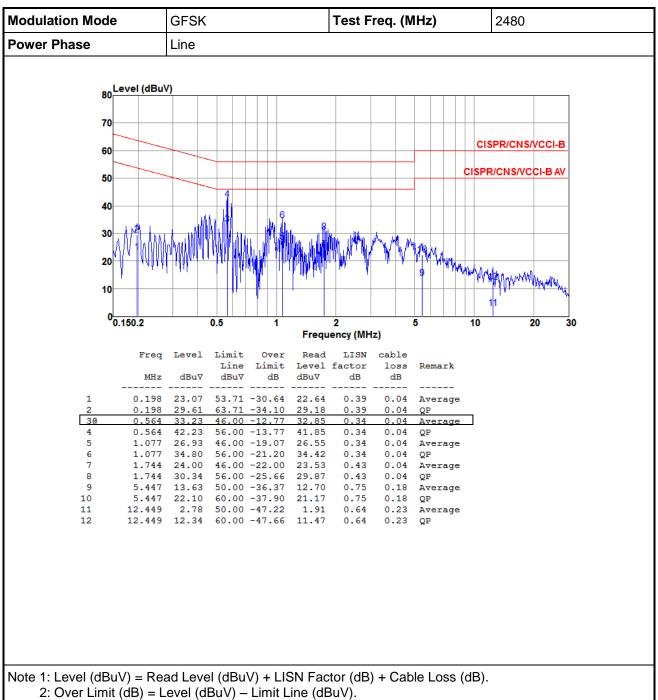
Note: 1. Support units were connected to second LISN.

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

Report No.: FR790403AE Page: 12 of 33

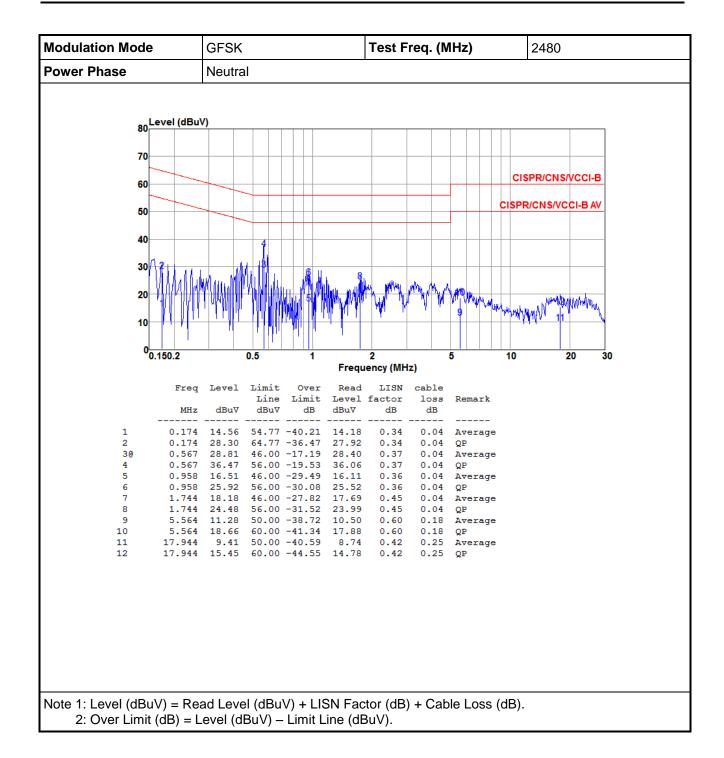


3.1.4 Test Result of Conducted Emissions



Report No.: FR790403AE Page: 13 of 33





Report No.: FR790403AE Page: 14 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

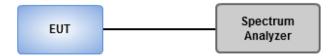
6dB Bandwidth

- 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.

Occupied Bandwidth

- 1. Set resolution bandwidth (RBW) = 30 kHz, Video bandwidth = 100 kHz.
- 2. Detector = Sample, Trace mode = max hold.
- 3 Sweep = auto couple, Allow the trace to stabilize.
- 4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.2.3 Test Setup

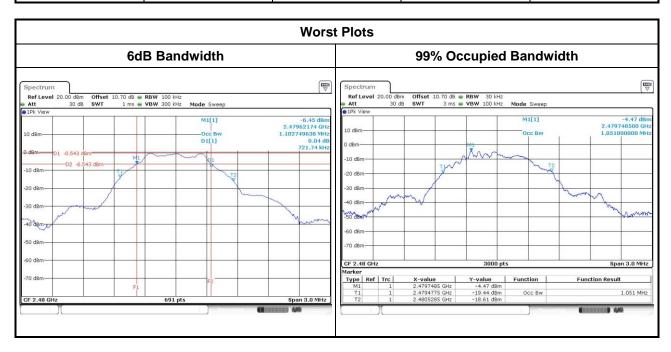


Report No.: FR790403AE Page: 15 of 33



3.2.4 Test Result of 6dB and Occupied Bandwidth

Mode	Freq. (MHz)	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit of 6dB Bandwidth (kHz)
BT LE	2402	0.722	1.05	500
BT LE	2440	0.726	1.05	500
BT LE	2480	0.722	1.05	500



Report No.: FR790403AE 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	Ante	enna 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

□ Spectrum analyzer

- 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

 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.: FR790403AE Page: 17 of 33



3.3.4 Test Result of Maximum Output Power

		Peak Power		Antenna	EIRP	EIRP	
Mode	Freq. (MHz)	Power (mW)	Power (dBm)	Limit (dBm)	gain (dBi)	(dBm)	Limit (dBm)
BT LE	2402	0.5188	-2.85	30	5.8	2.95	36
BT LE	2440	1.047	0.20	30	5.8	6.00	36
BT LE	2480	1.104	0.43	30	5.8	6.23	36

Mode	Freq. (MHz)	AV Power (mW)	AV Power (dBm)	Limit (dBm)
BT LE	2402	0.480	-3.19	
BT LE	2440	0.995	-0.02	
BT LE	2480	1.030	0.13	

Note: Average power is for reference only

Report No.: FR790403AE Page: 18 of 33



3.4 Power Spectral Density

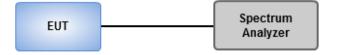
3.4.1 Limit of Power Spectral Density

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.
 - 1. 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

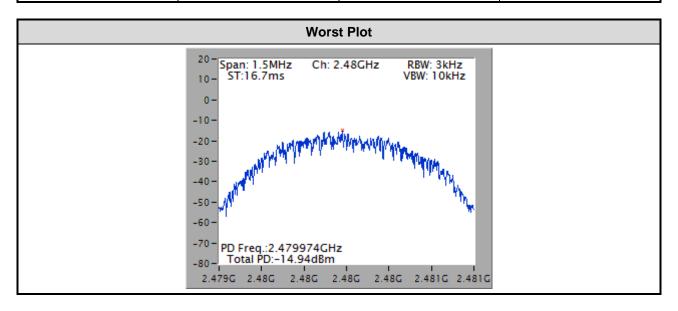


Report No.: FR790403AE Page: 19 of 33



3.4.4 Test Result of Power Spectral Density

Mode	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
BT LE	2402	-20.01	8
BT LE	2440	-15.21	8
BT LE	2480	-14.94	8



Report No.: FR790403AE 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 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.

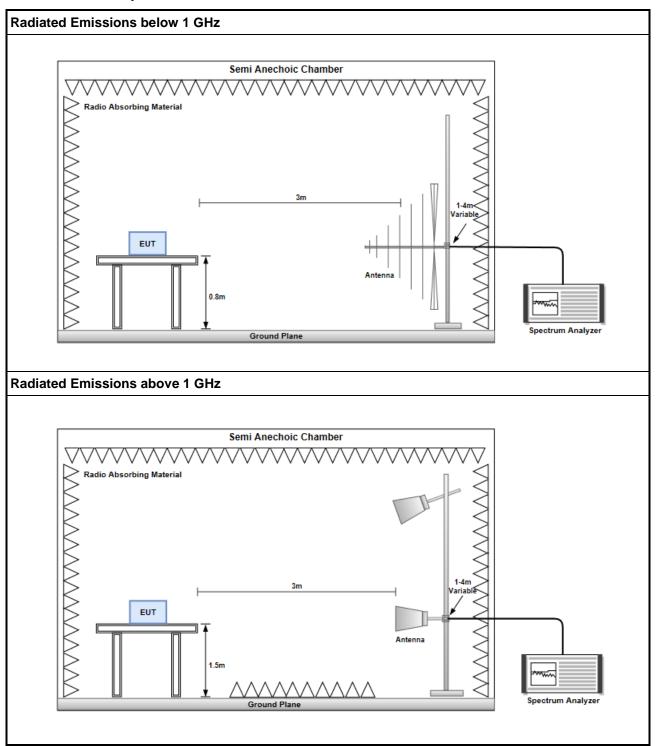
Note:

- 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.: FR790403AE Page: 21 of 33



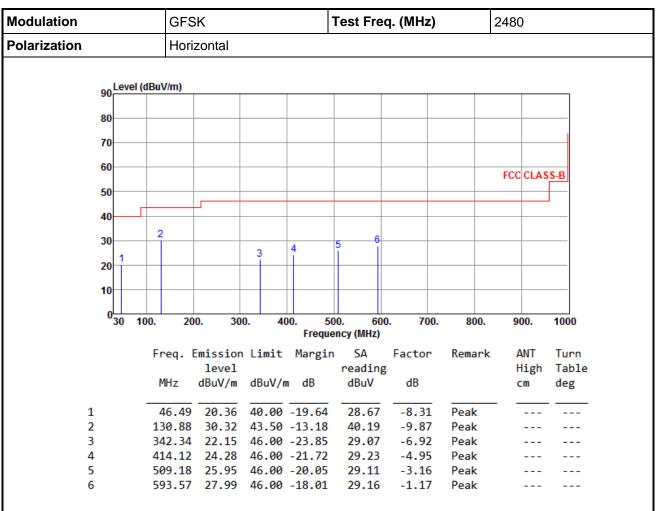
3.5.3 Test Setup



Report No.: FR790403AE 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)

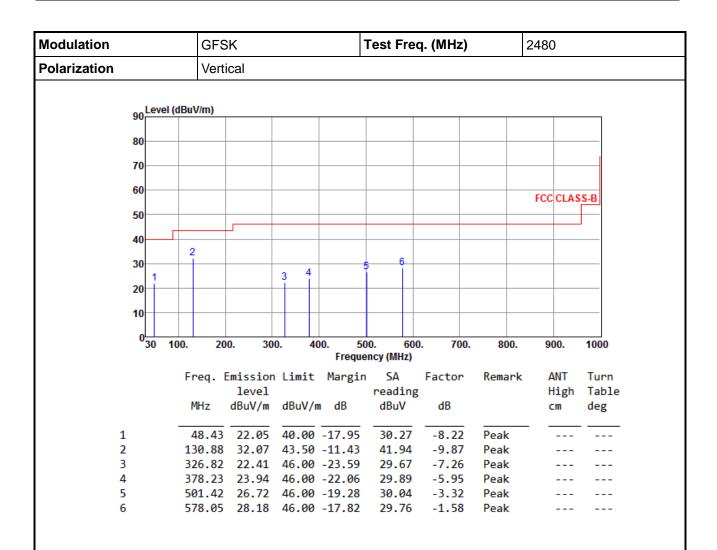
*Factor includes antenna factor, cable loss and amplifier gain

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.: FR790403AE Page: 23 of 33





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

*Factor includes antenna factor, cable loss and amplifier gain

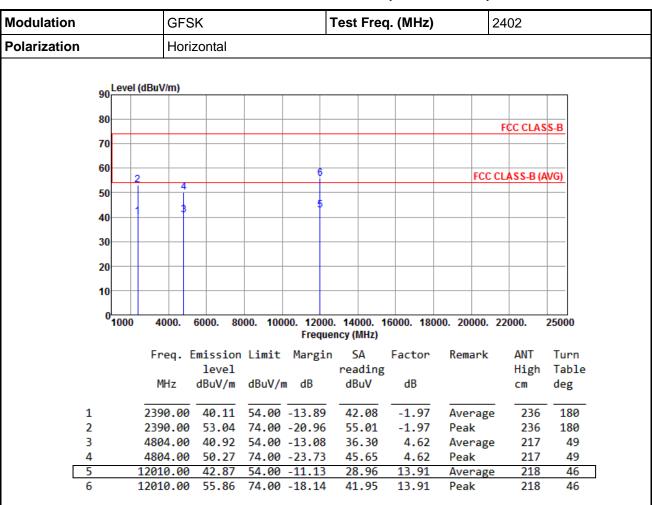
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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

Report No.: FR790403AE 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)

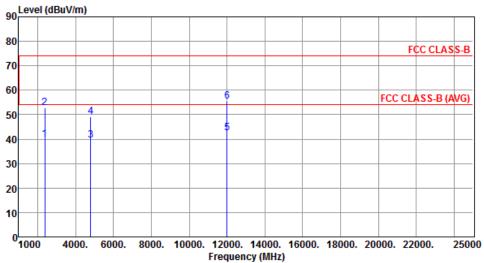
*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR790403AE Page: 25 of 33



Modulation	GFSK	Test Freq. (MHz)	2402					
Polarization	Vertical							
90 Level (dBuV/m)								



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	39.96	54.00	-14.04	41.93	-1.97	Average	235	245
2	2390.00	52.75	74.00	-21.25	54.72	-1.97	Peak	235	245
3	4804.00	39.65	54.00	-14.35	35.03	4.62	Average	125	69
4	4804.00	49.14	74.00	-24.86	44.52	4.62	Peak	125	69
5	12010.00	42.51	54.00	-11.49	28.60	13.91	Average	125	81
6	12010.00	55.62	74.00	-18.38	41.71	13.91	Peak	125	81

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).

Page: 26 of 33 Report No.: FR790403AE



Modulation			GF	GFSK			Test Freq. (MHz)			2440		
Polarization			Hoi	izontal		•			•			
	90	Level	(dBuV/m)									
	80											
										FCC CLAS	SS-B	
	70											
	60	-	,	6					FCC C	CLASS-B (A	AVG)	
	50										-	
	40	1		5								
	30											
	20										-	
	10											
	0	1000	4000.	6000. 8	000. 100		. 14000. 1 ncy (MHz)	16000. 180	00. 20000. 2	22000.	25000	
			Frea.	Emission	Limit	_		Factor	Remark	ANT	Turn	
				level		0	reading			High	Table	
			MHz	dBuV/m	dBuV/ı	n dB	dBuV	dB		cm	deg	
:	1		2390.00	39.85	54.00	-14.15	41.82	-1.97	Average	226	181	
	2			52.91	74.00	-21.09	54.88	-1.97	Peak	226	181	
	3		4880.00	42.31	54.00	-11.69	37.53	4.78	Average	219	51	

4.78

9.34

9.34

Peak

Peak

Average

219

216

216

51

66

66

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

4880.00 52.36 74.00 -21.64 47.58

7320.00 40.69 54.00 -13.31 31.35 7320.00 52.48 74.00 -21.52 43.14

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

Report No.: FR790403AE Page: 27 of 33

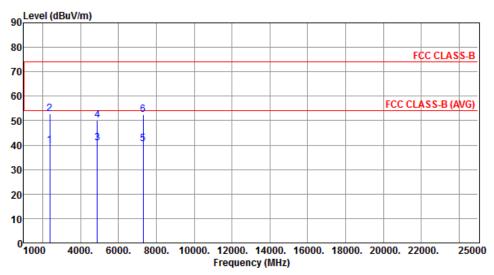
Report Version: Rev. 01

5

6



Modulation	GFSK	Test Freq. (MHz)	2440
Polarization	Vertical		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	39.84	54.00	-14.16	41.81	-1.97	Average	238	235
2	2390.00	52.65	74.00	-21.35	54.62	-1.97	Peak	238	235
3	4880.00	40.76	54.00	-13.24	35.98	4.78	Average	124	65
4	4880.00	50.25	74.00	-23.75	45.47	4.78	Peak	124	65
5	7320.00	40.61	54.00	-13.39	31.27	9.34	Average	129	77
6	7320.00	52.44	74.00	-21.56	43.10	9.34	Peak	129	77

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.: FR790403AE Page: 28 of 33



Modulation		GFS	GFSK				Test Freq. (MHz)			2480		
Polarization			Hori	Horizontal								
	90	Level	(dBuV/m)									
	80									FCC CLAS	e D	
	70									TCC CLAS	э-Б	
	60		2 4						FCC (CLASS-B (A	WG)	
	50		1	6					1001	CLRSS-D (F	(0)	
	40		1 1	5								
	30											
	20											
	10											
	0	1000	4000.	6000. 80	000. 100	000. 12000	0. 14000. 1	16000. 180	00. 20000.	22000.	25000	
							ency (MHz)					
			Freq.		Limit	Margin		Factor	Remark	ANT	Turn	
			MHz	level dBuV/m	dBuV/	m dB	reading dBuV	dB		High cm	Table deg	
	1		2483.50	41.14	54.00	-12.86	42.76	-1.62	Average	226	185	
	2		2483.50	53.53	74.00	-20.47	55.15	-1.62	Peak	226	185	
	3		4960.00	43.56	54.00	-10.44	38.63	4.93	Average	216	55	

48.52

31.19

4.93

9.68

9.68

Peak

Peak

Average

216

216

216

55

61

61

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

4960.00 53.45 74.00 -20.55

7440.00 40.87 54.00 -13.13

7440.00 52.63 74.00 -21.37 42.95

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

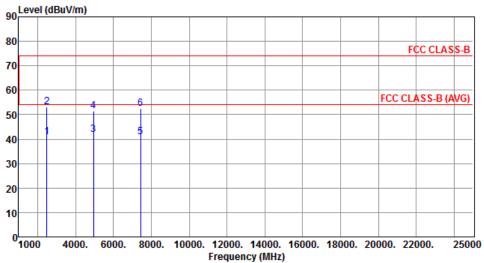
Report No.: FR790403AE Page: 29 of 33

Report Version: Rev. 01

5



Modulation	GFSK	Test Freq. (MHz)	2480					
Polarization	Vertical							
90 Level (dBuV/m)								



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	40.96	54.00	-13.04	42.58	-1.62	Average	238	233
2	2483.50	53.22	74.00	-20.78	54.84	-1.62	Peak	238	233
3	4960.00	41.85	54.00	-12.15	36.92	4.93	Average	125	68
4	4960.00	51.33	74.00	-22.67	46.40	4.93	Peak	125	68
5	7440.00	40.84	54.00	-13.16	31.16	9.68	Average	131	85
6	7440.00	52.57	74.00	-21.43	42.89	9.68	Peak	131	85

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.: FR790403AE Page: 30 of 33



3.6 Emissions in non-restricted Frequency Bands

3.6.1 Emissions in non-restricted frequency bands limit

The peak output power measured 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 Test Procedures

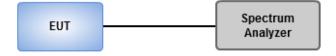
Reference Level Measurement

- 1. Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
- 2. Set Sweep time = auto couple, Trace mode = max hold.
- 3. Allow trace to fully stabilize.
- 4. Use the peak marker function to determine the maximum amplitude level.

Unwanted Emissions Level Measurement

- 1. Set RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
- 2. Trace Mode = max hold, Sweep = auto couple.
- 3. Allow the trace to stabilize.
- 4. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

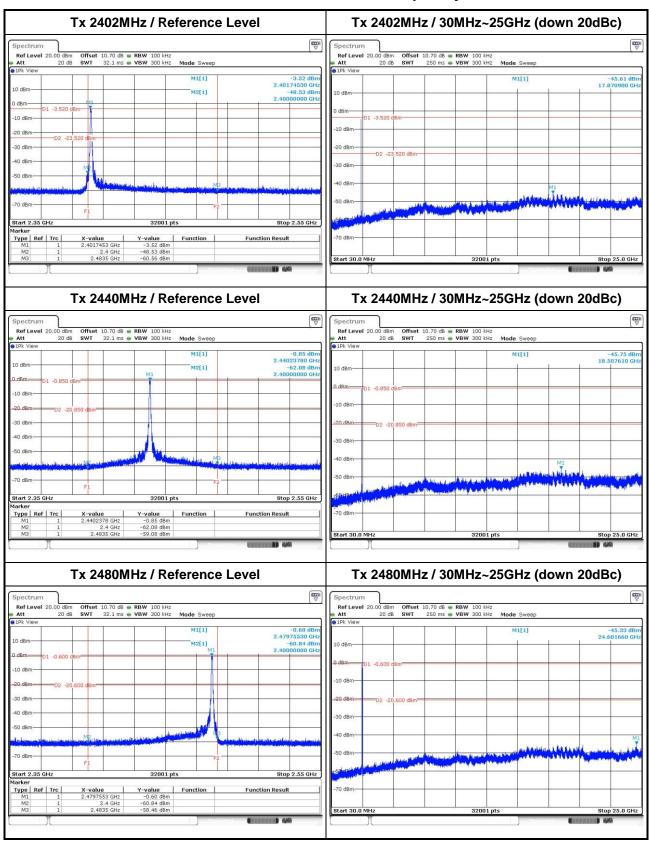
3.6.3 Test Setup



Report No.: FR790403AE Page: 31 of 33



3.6.4 Test Result of Emissions in non-restricted Frequency Bands



Report No.: FR790403AE Report Version: Rev. 01



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 (EMC and Wireless Communication Laboratory), 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 District. 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 District, Tao Yuan City 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 District, Tao Yuan City 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.: FR790403AE Page: 33 of 33