

FCC Part 15C Measurement and Test Report

For

MAG DIGITAL LIMITED

Rm918, East Baihuo Plaza No3020, ShenNan East Road, Luohu District,

Shenzhen City, Guangdong Province, China 518000

FCC ID: N8O-B26T

FCC Rule(s): FCC Part 15.247

Product Description: MID

Tested Model: B26T

Report No.: STR14048407I-3

Tested Date: 2014-05-26 to 2014-06-11

Issued Date: 2014-06-11

Tested By: Seven Song / Engineer

Seven Song

Reviewed By: Lahm Peng / EMC Manager

Lahm peng

Approved & Authorized By: Jandy so / PSQ Manager

Jandyso

Prepared By:

Shenzhen SEM.Test Technology Co., Ltd.

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C. (518101)

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

TABLE OF CONTENTS

1. GENERAL INFORMATION	3
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
1.2 TEST STANDARDS	4
1.3 TEST METHODOLOGY	4
1.4 TEST FACILITY	4
1.5 EUT SETUP AND TEST MODE	5
2. SUMMARY OF TEST RESULTS	6
3. RF EXPOSURE	7
3.1 STANDARD APPLICABLE	7
3.2 TEST RESULT	7
4. ANTENNA REQUIREMENT	8
4.1 STANDARD APPLICABLE	8
4.2 EVALUATION INFORMATION	8
5. POWER SPECTRAL DENSITY	9
5.1 STANDARD APPLICABLE	9
5.2 TEST EQUIPMENT LIST AND DETAILS	9
5.3 TEST PROCEDURE	9
5.4 ENVIRONMENTAL CONDITIONS	9
5.5 SUMMARY OF TEST RESULTS/PLOTS	10
6. 6DB BANDWIDTH	13
6.1 STANDARD APPLICABLE	13
6.2 TEST EQUIPMENT LIST AND DETAILS	13
6.3 TEST PROCEDURE	13
6.4 ENVIRONMENTAL CONDITIONS	13
6.5 SUMMARY OF TEST RESULTS/PLOTS	14
7. RF OUTPUT POWER	17
7.1 STANDARD APPLICABLE	17
7.2 TEST EQUIPMENT LIST AND DETAILS	17
7.3 TEST PROCEDURE	17
7.4 ENVIRONMENTAL CONDITIONS	17
7.5 SUMMARY OF TEST RESULTS/PLOTS	18
8. FIELD STRENGTH OF SPURIOUS EMISSIONS	19
8.1 MEASUREMENT UNCERTAINTY	19
8.2 STANDARD APPLICABLE	19
8.3 TEST EQUIPMENT LIST AND DETAILS	19
8.4 TEST PROCEDURE	20
8.5 CORRECTED AMPLITUDE & MARGIN CALCULATION	20
8.6 ENVIRONMENTAL CONDITIONS	21
8.7 SUMMARY OF TEST RESULTS/PLOTS	21
9. OUT OF BAND EMISSIONS	29
9.1 STANDARD APPLICABLE	29
9.2 TEST EQUIPMENT LIST AND DETAILS	29
9.3 TEST PROCEDURE	29
9.4 ENVIRONMENTAL CONDITIONS	30
9.5 SUMMARY OF TEST RESULTS/PLOTS	30
10. CONDUCTED EMISSIONS	33
10.1 MEASUREMENT UNCERTAINTY	33
10.2 TEST EQUIPMENT LIST AND DETAILS	33
10.3 TEST PROCEDURE	33
10.4 BASIC TEST SETUP BLOCK DIAGRAM	33
10.5 ENVIRONMENTAL CONDITIONS	34
10.6 TEST RECEIVER SETUP	34
10.7 SUMMARY OF TEST RESULTS/PLOTS	34
10.8 CONDUCTED EMISSIONS TEST DATA	34

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: MAG DIGITAL LIMITED
Address of applicant: Rm918, East Baihuo Plaza No3020, ShenNan East Road,
Luohu District, Shenzhen City, Guangdong Province,
China 518000
Manufacturer: EA Excelsior Hangtong Computer Technology Co., Ltd
Address of manufacturer: Rm. 1901B, International Culture Building, Futian
Road, Futian district, Shenzhen, P.R.China

General Description of EUT

Product Name:	MID
Trade Name:	N/A
Model No.:	B26
Rated Voltage:	Battery: DC 3.7V
Battery Capacity	8500mAh

Note: The test data is gathered from a production sample provided by the manufacturer.

Technical Characteristics of EUT

Bluetooth Version:	V4.0
Frequency Range:	2402-2480MHz
RF Output Power:	0.413dBm (Conducted)
Data Rate:	GFSK, Pi/4 DQPSK, 8DPSK
Modulation:	25Mbps
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	Integral
Antenna Gain:	0dBi
Lowest Internal Frequency	32.768kHz

1.2 Test Standards

The following report is prepared on behalf of the MAG DIGITAL LIMITED in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 558074 D01 V03r02 for digital transmission systems shall be performed also.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Low Channel	2402MHz
TM2	Middle Channel	2442MHz
TM3	High Channel	2480MHz
TM4	Hopping	2402-2480MHz

Modulation Configure			
Modulation	Packet	Packet Type	Packet Size
GFSK	DH1	4	27
	DH3	11	183
	DH5	15	339
Pi/4 DQPSK	2DH1	20	54
	2DH3	26	367
	2DH5	30	379
8DPSK	3DH1	24	83
	3DH3	27	552
	3DH5	31	1021

Normal mode: the Bluetooth has been tested on the modulation of GFSK, (Pi/4)DQPSK and 8DPSK, compliance test and record the worst case.

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
DC Power Cable	1.2	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 2.1093	RF Exposure	Compliant
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	RF Output Power	Compliant
§ 15.209(a)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure; please see the SAR Report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

4.2 Evaluation Information

This product has an integral antenna, fulfill the requirement of this section.

5. Power Spectral Density

5.1 Standard Applicable

According to 15.247(a)(1)(iii), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

5.3 Test Procedure

According to the KDB 558074 D01 V03r02, the test method of power spectral density as below:

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set analyzer center frequency to DTS channel center frequency.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW ≥ 3 kHz.
5. Set the VBW $\geq 3 \times$ RBW.
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level.
11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.4 Environmental Conditions

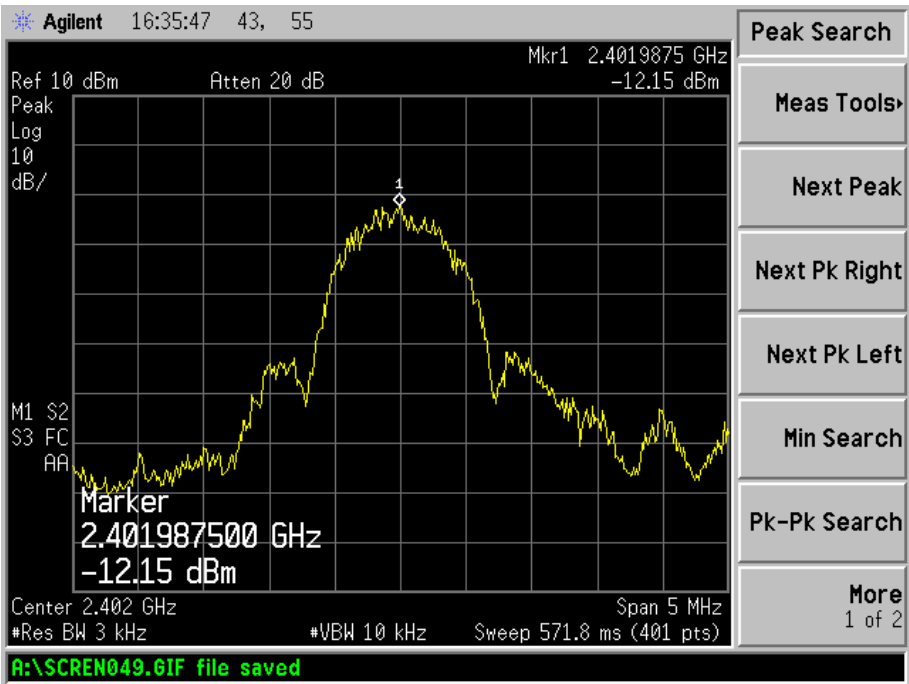
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

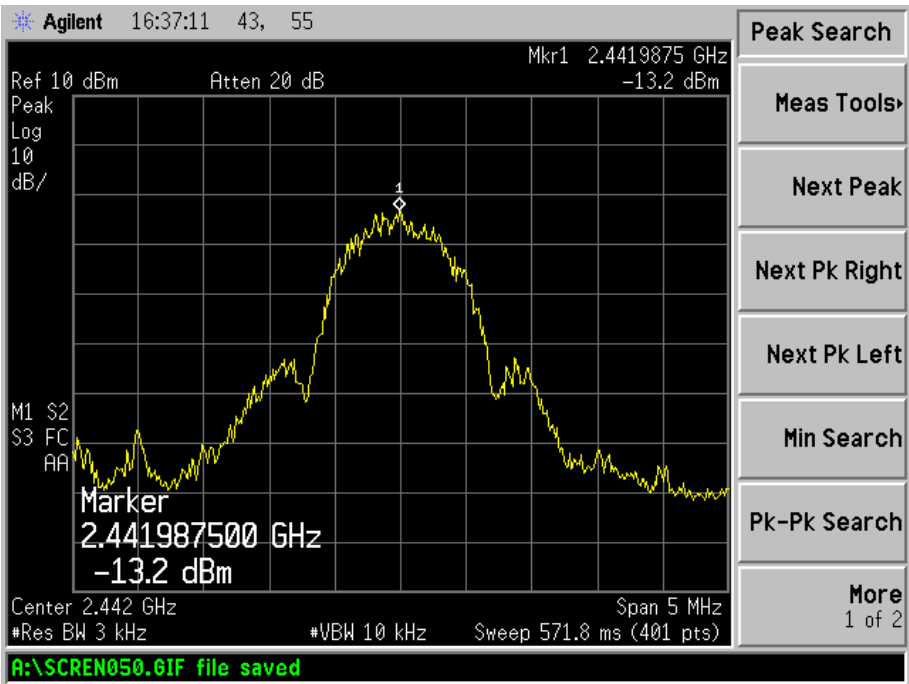
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
GFSK(BLE)	2402	-12.15	8
	2442	-13.20	8
	2480	-14.63	8

Please refer to the following test plots:

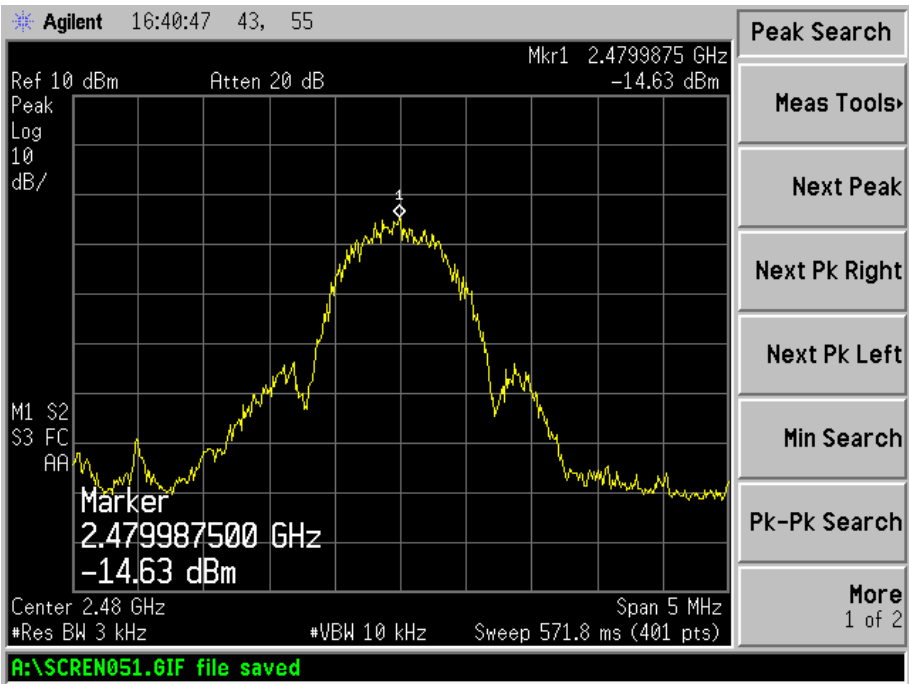
Low Channel



Middle Channel



High Channel



6. 6dB Bandwidth

6.1 Standard Applicable

According to 15.247(a)(2). Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

6.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
3. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. 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 6 dB relative to the maximum level measured in the fundamental emission..

6.4 Environmental Conditions

Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

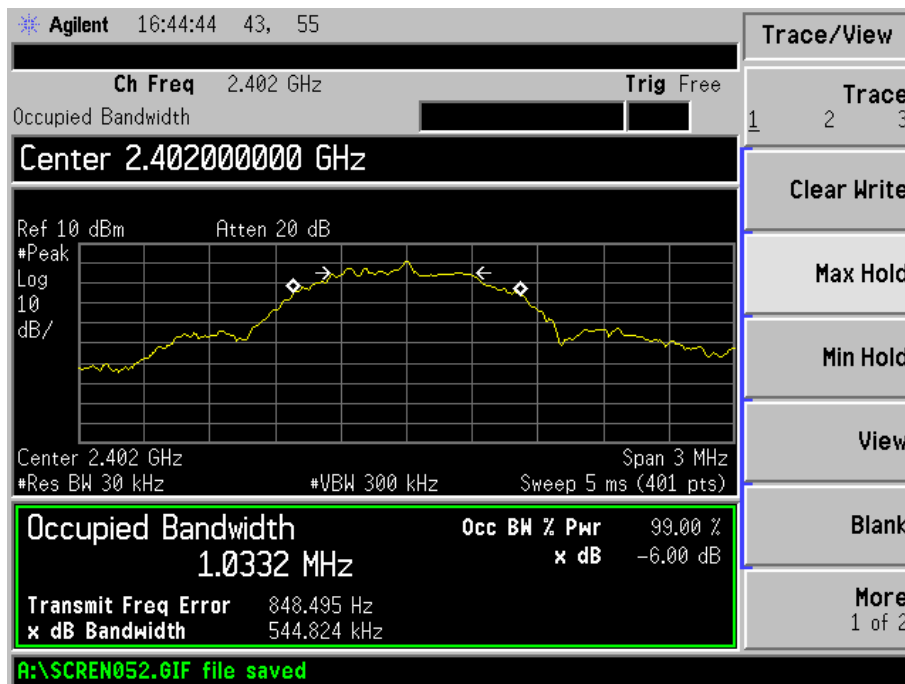
6.5 Summary of Test Results/Plots

Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
GFSK(BLE)	2402	544.824	1033.2	500
	2442	547.480	1031.4	500
	2480	560.086	1027.2	500

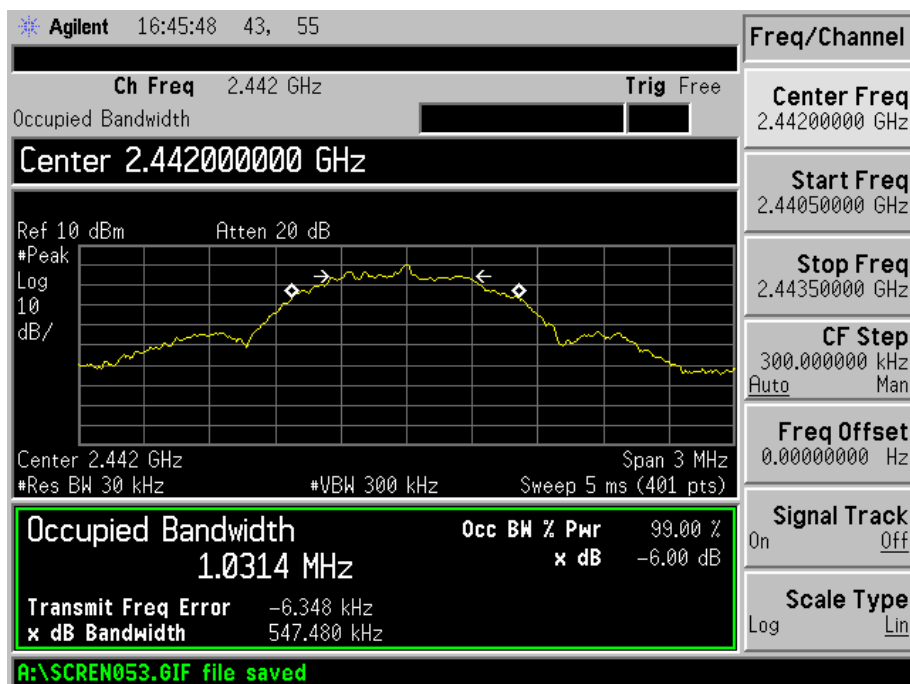
Please refer to the following test plots:

For BLE

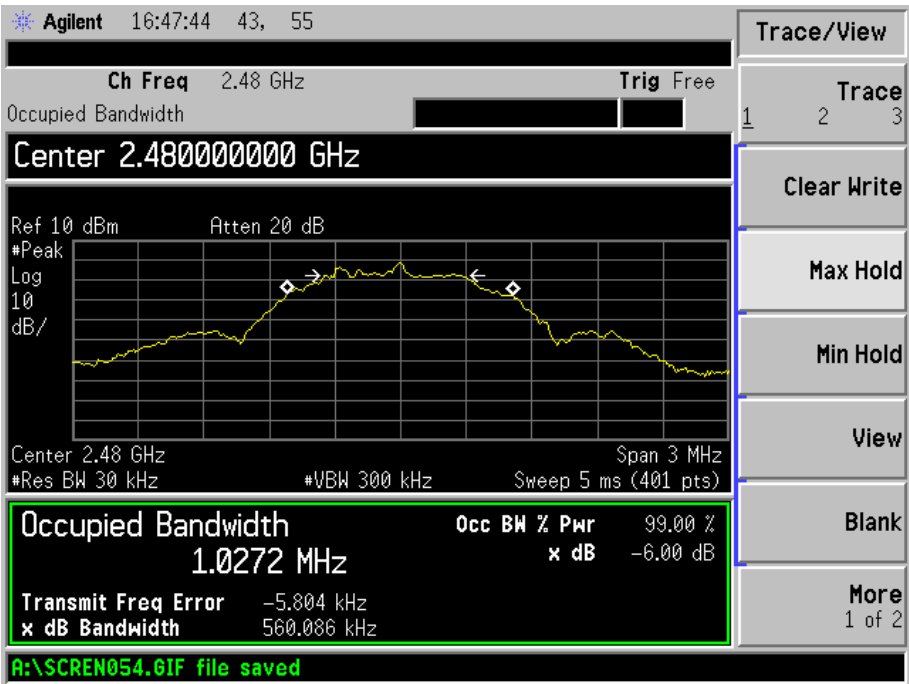
Low Channel:



Middle Channel:



High Channel:



7. RF Output Power

7.1 Standard Applicable

According to 15.247(b)(3). For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

7.3 Test Procedure

According to section 15.247(b)-power output of the KDB-558074 D01 V03r02, 8.1.2 Option 2 (channel integration method) this procedure should only be used when the maximum available RBW of the spectrum/signal analyzer is less than the DTS bandwidth.

1. Set the RBW = maximum available (at least 1 MHz).
2. Set the VBW = 3 x RBW or maximum available setting (must be $\geq$ RBW).
3. Set the span to fully encompass the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the spectrum analyzer's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some analyzers, this may require a manual override to ensure use of peak detector).

7.4 Environmental Conditions

Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

7.5 Summary of Test Results/Plots

Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
GFSK(BLE)	2402	0.374	1.090	1000
	2442	0.406	1.098	1000
	2480	0.413	1.100	1000

Note: the antenna gain of 0dBi less than 6dBi maximum permission antenna gain value based on 1 watt peak output power limit.

8. Field Strength of Spurious Emissions

8.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 5.10 dB.

8.2 Standard Applicable

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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).

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.3 Test Equipment List and Details

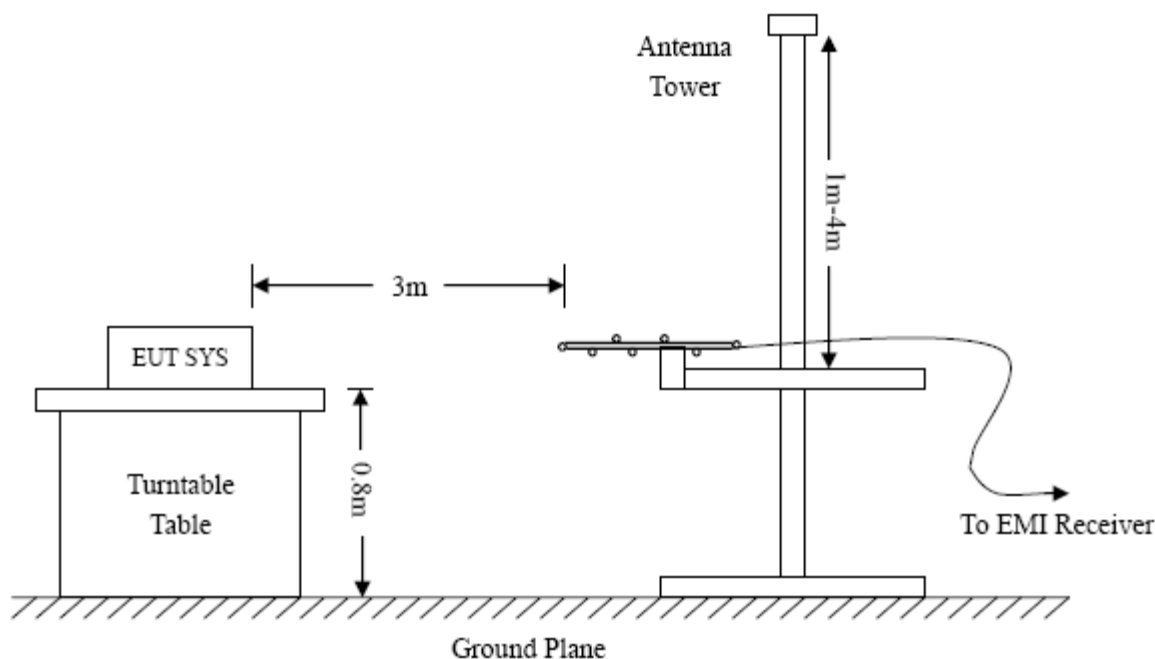
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Horn Antenna	ETS	3116B	00088203	2014-05-24	2015-05-23
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-05-24	2015-05-23

8.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



Frequency :9kHz-30MHz

RBW=10KHz,

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

Frequency :Above 1GHz

RBW=1MHz,

VBW=3MHz(Peak), 10Hz(AV)

Sweep time= Auto

Trace = max hold

Detector function = peak, AV

8.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

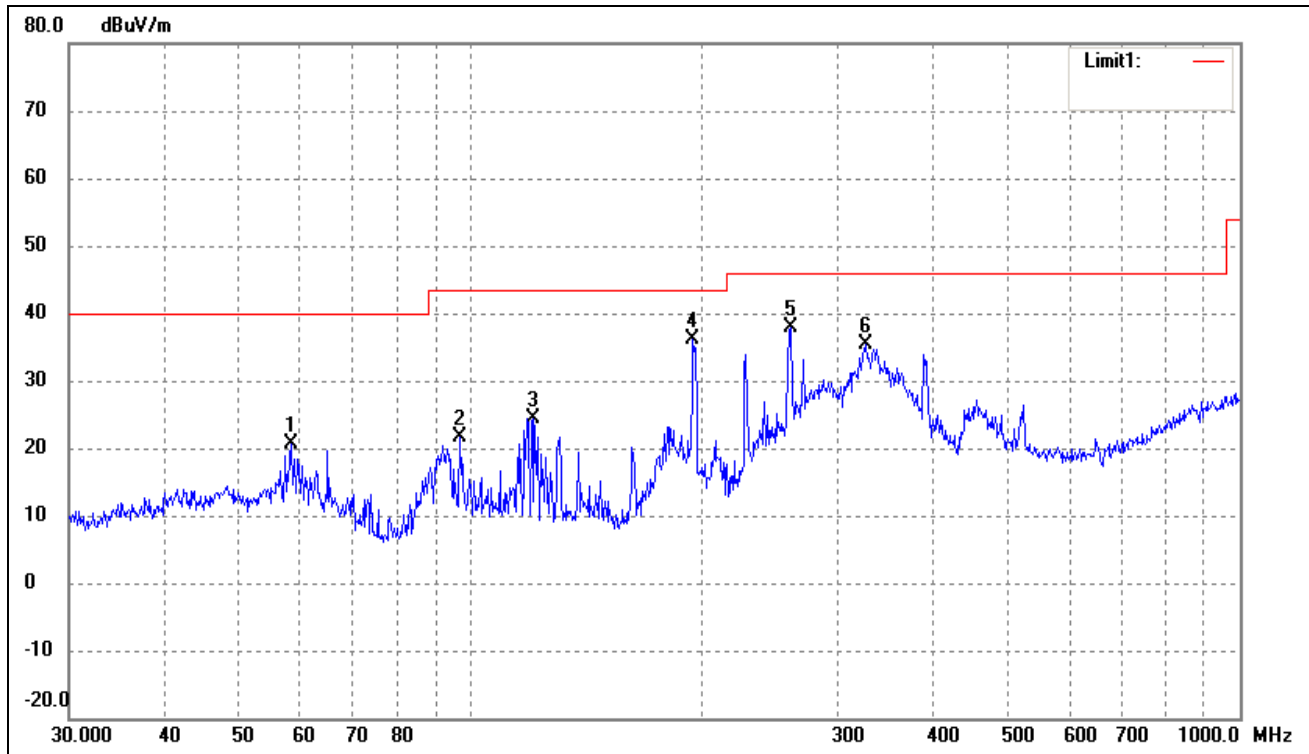
8.6 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

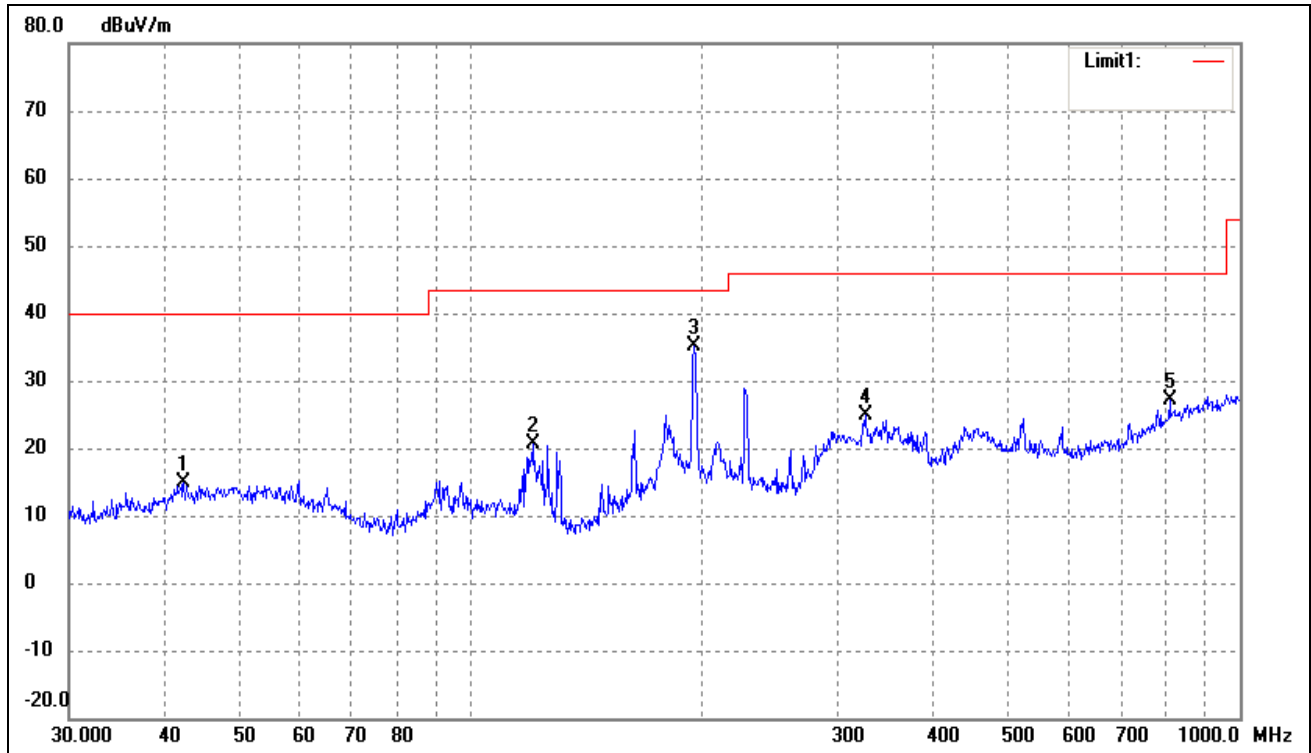
8.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Plot of Radiated Emissions Test Data (30MHz to 1GHz)EUT: *MID*Tested Model: *B26T*Operating Condition: *Transmitting Low Channel (2402MHz)-BLE*Comment: *Battery DC 3.7V*Test Specification: *Horizontal*

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Detector
1	58.4074	29.27	-8.65	20.62	40.00	-19.38	247	100	peak
2	96.7749	31.51	-9.95	21.56	43.50	-21.94	262	100	peak
3	120.2766	35.76	-11.31	24.45	43.50	-19.05	360	100	peak
4*	194.4534	45.62	-9.61	36.01	43.50	-7.49	263	200	peak
5	261.0583	45.05	-7.16	37.89	46.00	-8.11	330	200	peak
6	325.5958	40.57	-5.24	35.33	46.00	-10.67	139	100	peak

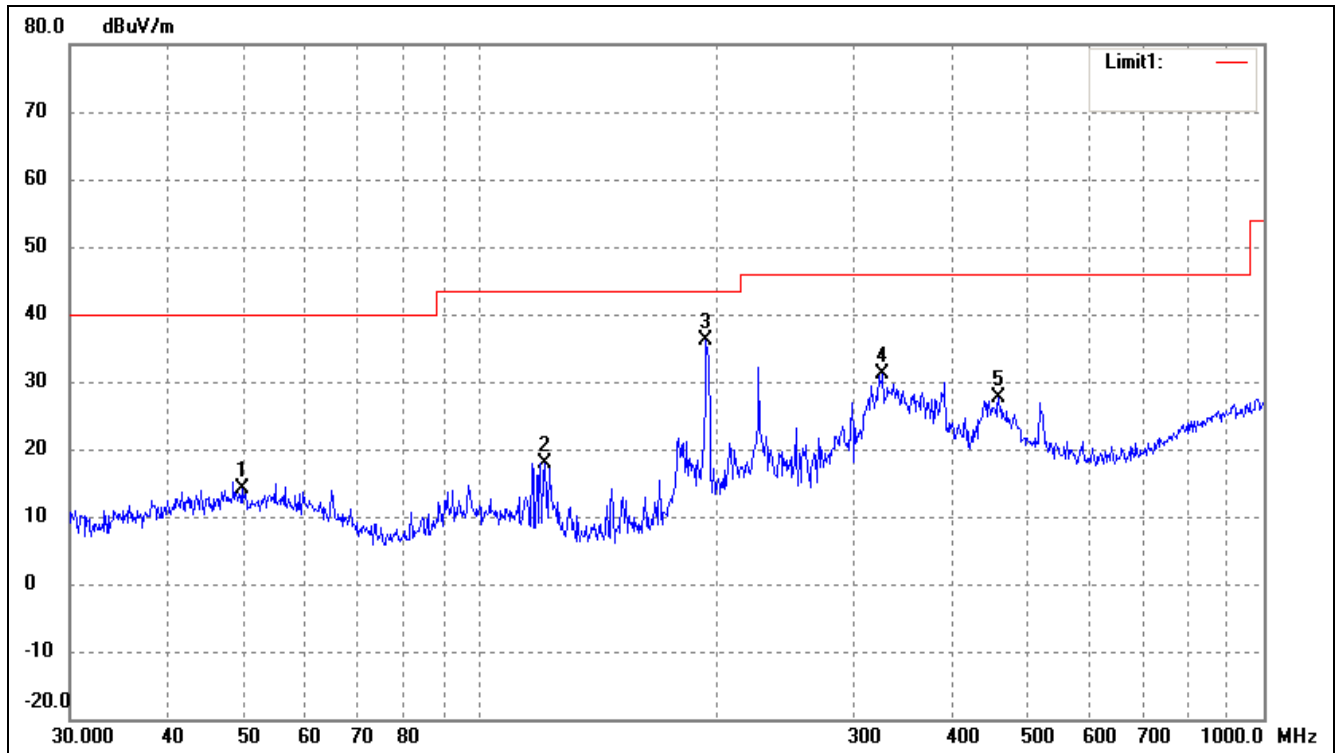


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Detector
1	42.3022	22.90	-8.00	14.90	40.00	-25.10	145	100	peak
2	120.2766	31.92	-11.31	20.61	43.50	-22.89	260	100	peak
3*	195.1365	44.63	-9.55	35.08	43.50	-8.42	113	100	peak
4	325.5958	30.05	-5.24	24.81	46.00	-21.19	360	100	peak
5	810.2654	23.23	3.86	27.09	46.00	-18.91	360	100	peak

Operating Condition: Transmitting Middle Channel (2442MHz)-BLE

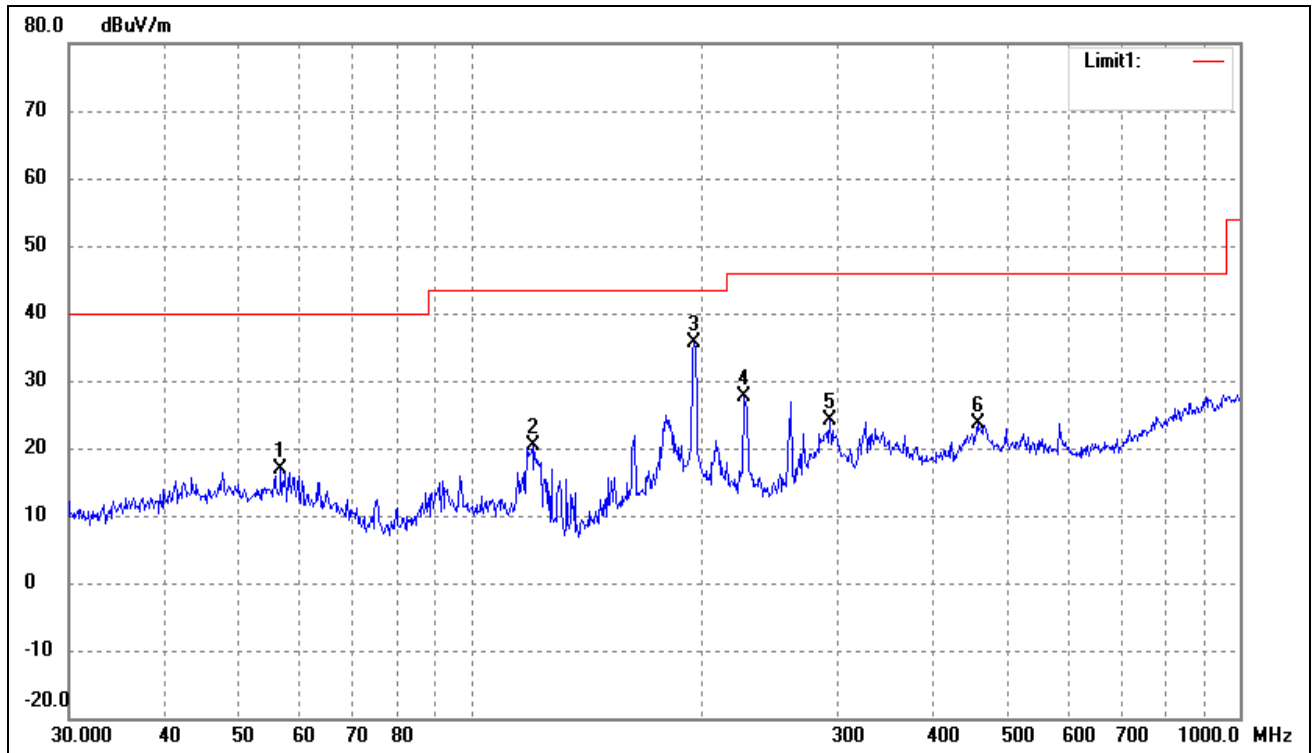
Comment: Battery DC 3.7V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Detector
1	49.7068	21.64	-7.44	14.20	40.00	-25.80	114	100	peak
2	121.1231	29.38	-11.43	17.95	43.50	-25.55	262	100	peak
3*	194.4534	45.80	-9.61	36.19	43.50	-7.31	360	100	peak
4	326.7395	36.33	-5.18	31.15	46.00	-14.85	360	100	peak
5	459.1144	29.64	-2.07	27.57	46.00	-18.43	113	100	peak

Test Specification: Vertical

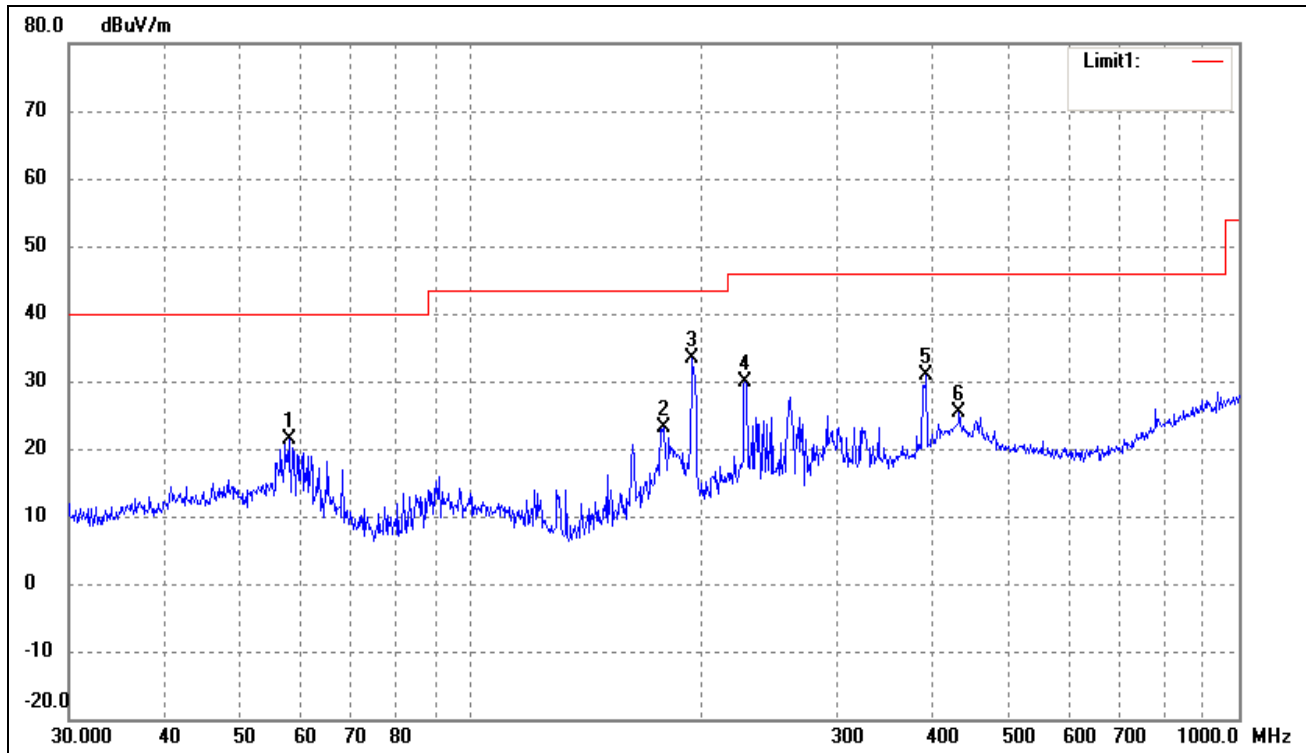


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Detector
1	56.5929	25.19	-8.21	16.98	40.00	-23.02	225	100	peak
2	120.2766	31.74	-11.31	20.43	43.50	-23.07	236	100	peak
3*	195.1365	45.07	-9.55	35.52	43.50	-7.98	162	100	peak
4	226.0994	36.16	-8.57	27.59	46.00	-18.41	360	200	peak
5	293.0842	30.41	-6.34	24.07	46.00	-21.93	226	100	peak
6	455.9058	25.79	-2.10	23.69	46.00	-22.31	360	100	peak

Operating Condition: Transmitting High Channel (2480MHz)-BLE

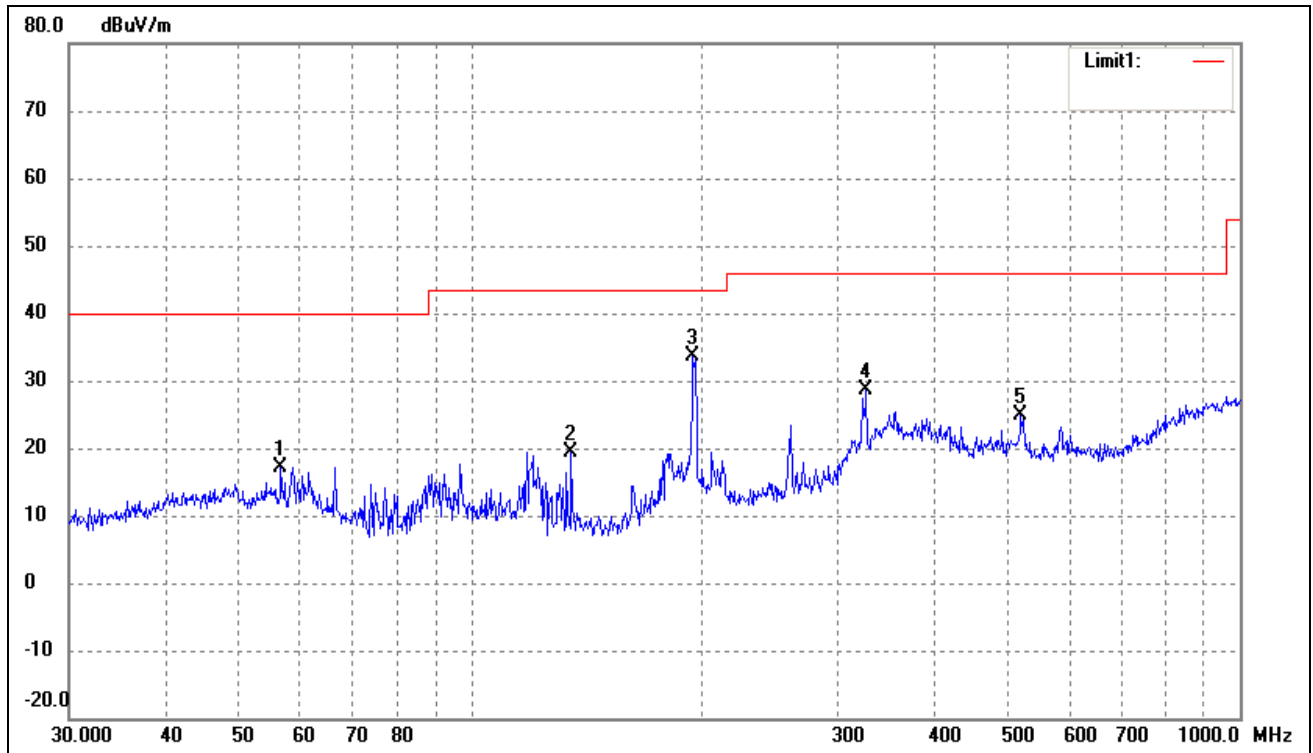
Comment: Battery DC 3.7V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Detector
1	57.9993	29.82	-8.55	21.27	40.00	-18.73	272	100	peak
2	178.1327	34.45	-11.28	23.17	43.50	-20.33	360	100	peak
3*	194.4534	43.06	-9.61	33.45	43.50	-10.05	336	200	peak
4	227.6906	38.31	-8.49	29.82	46.00	-16.18	182	200	peak
5	392.0951	34.14	-3.19	30.95	46.00	-15.05	93	200	peak
6	432.5457	27.67	-2.34	25.33	46.00	-20.67	113	200	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Detector
1	56.5929	25.33	-8.21	17.12	40.00	-22.88	224	100	peak
2	135.0319	32.43	-12.95	19.48	43.50	-24.02	187	100	peak
3*	194.4534	43.21	-9.61	33.60	43.50	-9.90	260	100	peak
4	326.7395	33.78	-5.18	28.60	46.00	-17.40	178	100	peak
5	519.0649	25.53	-0.65	24.88	46.00	-21.12	289	100	peak

*Spurious Emissions Above 1GHz**Transmitting: BLE mode:*

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2402MHz							
4804	53.03	0.57	53.6	74	-20.4	H	PK
4804	46.53	0.57	47.1	54	-6.9	H	AV
7206	47.41	3.69	51.1	74	-22.9	H	PK
7206	46.21	3.69	49.9	54	-4.1	H	AV
4804	54.63	0.57	55.2	74	-18.8	V	PK
4804	45.13	0.57	45.7	54	-8.3	V	AV
7206	52.81	3.69	56.5	74	-17.5	V	PK
7206	44.91	3.69	48.6	54	-5.4	V	AV
Middle Channel-2442MHz							
4884	51.49	0.64	52.13	74	-21.87	H	PK
4884	47.03	0.64	47.67	54	-4.33	H	AV
7326	46.77	3.75	50.52	74	-17.63	H	PK
7326	41.75	3.75	45.50	54	-8.50	H	AV
4884	46.46	0.64	47.10	74	-26.90	V	PK
4884	40.59	0.64	41.23	54	-12.77	V	AV
7326	43.21	3.75	46.96	74	-27.04	V	PK
7326	33.78	3.75	37.53	54	-16.47	V	AV
High Channel-2480MHz							
4960	60.68	0.72	61.40	74	-12.60	H	PK
4960	50.70	0.72	51.42	54	-2.58	H	AV
7440	48.86	3.81	52.67	74	-21.33	H	PK
7440	40.25	3.81	44.06	54	-9.94	H	AV
4960	52.40	0.72	53.12	74	-20.88	V	PK
4960	43.54	0.72	44.26	54	-9.74	V	AV
7440	45.17	3.81	48.98	74	-25.02	V	PK
7440	35.86	3.81	39.67	54	-14.33	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The measurements greater than 20dB below the limit from 9kHz to 30MHz.

9. Out of Band Emissions

9.1 Standard Applicable

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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).

9.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23

9.3 Test Procedure

According to the KDB 558074 D01 v03r02, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

According to the KDB 558074 D01 V03r02, the conducted spurious emissions test method as follows:

1. Set start frequency to DTS channel edge frequency.
2. Set stop frequency so as to encompass the spectrum to be examined.
3. Set RBW = 100 kHz.
4. Set VBW $\geq$ 300 kHz.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

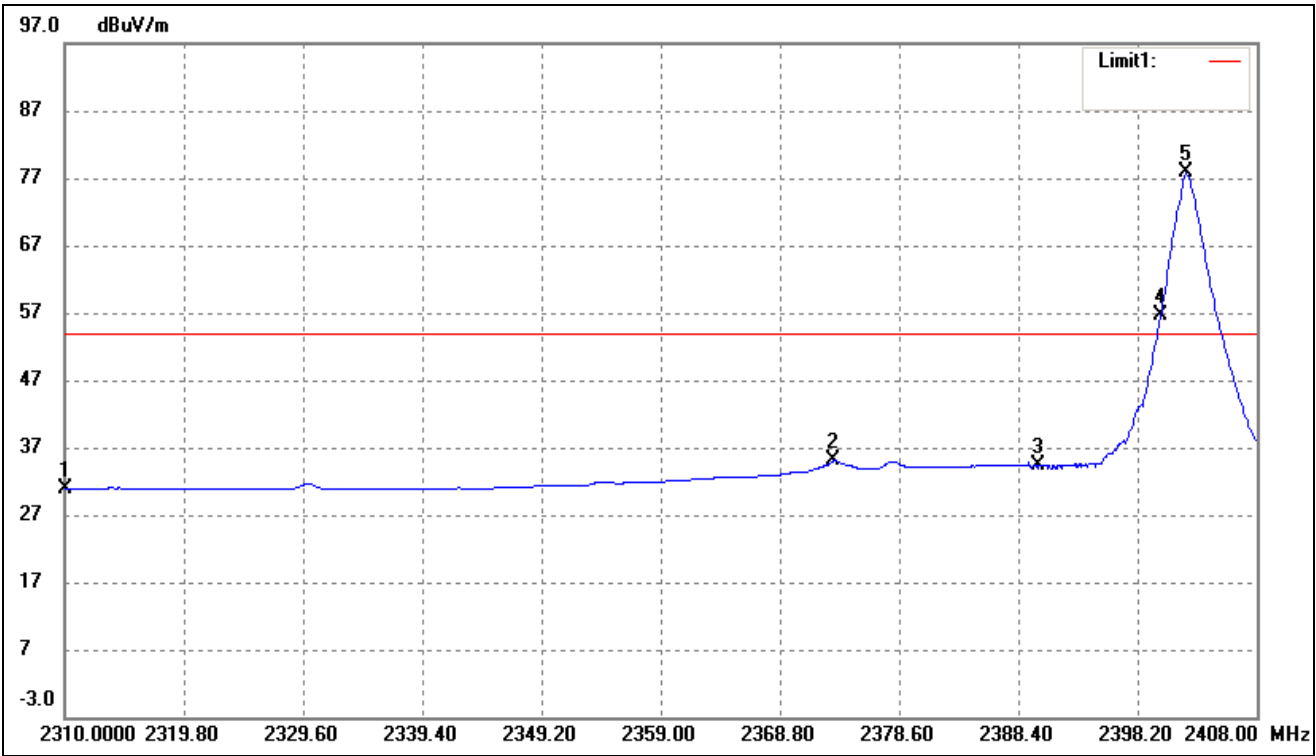
9.4 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.5 Summary of Test Results/Plots

Please refer to the test plots as below.

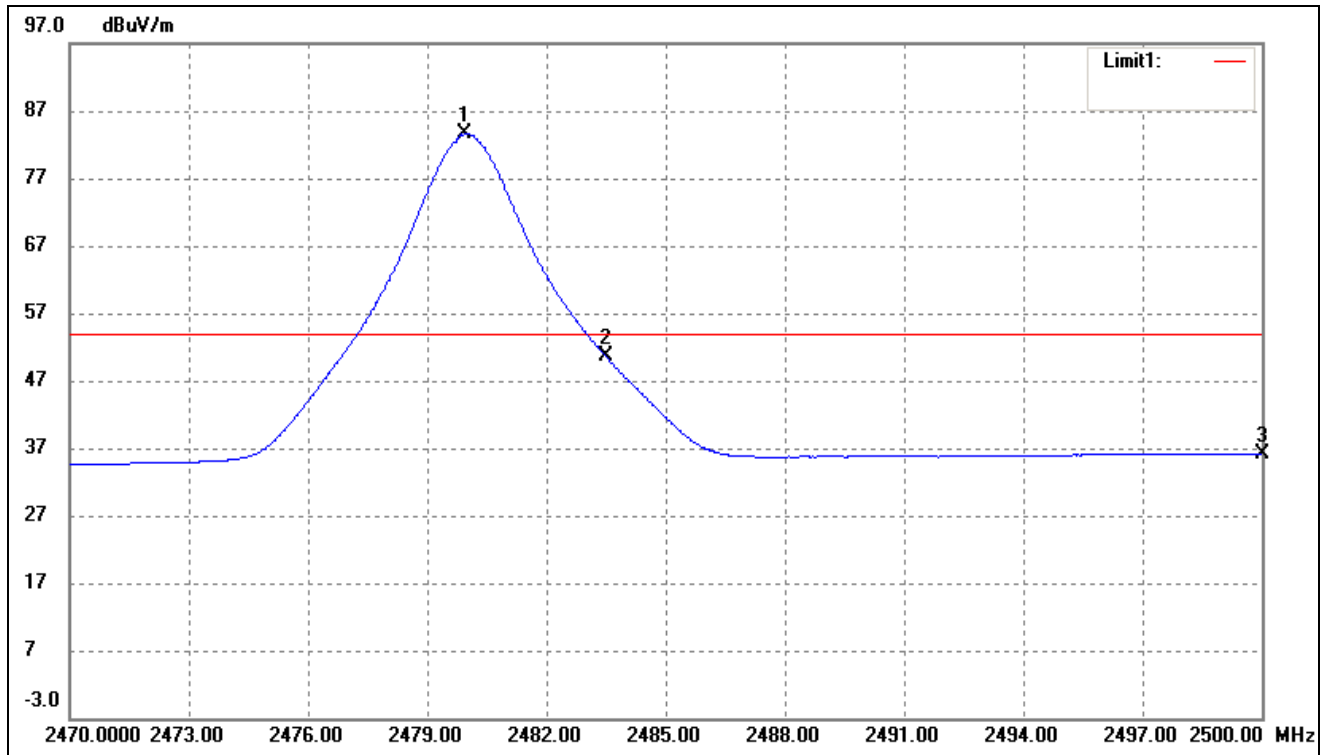
Bandedge (Radiated)
Lowest Bandedge-BLE
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	14.57	16.34	30.91	54.00	-23.09	Average Detector
	2310.000	25.22	16.34	41.56	74.00	-32.44	Peak Detector
2	2373.210	18.21	16.88	35.09	54.00	-18.91	Average Detector
3	2390.000	17.34	17.03	34.37	54.00	-19.63	Average Detector
	2390.000	28.64	17.03	45.67	74.00	-28.33	Peak Detector
4	2400.000	39.41	17.11	56.52	Delta = 21.34dBc		Average Detector
5	2402.120	60.74	17.12	77.86			Average Detector

Highest Bandedge-BLE

Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	65.94	17.71	83.65	/	/	Average
	2480.000	83.56	17.70	101.26	/	/	Peak Detector
2	2483.500	Delta = 56.17dBc		27.48	54.00	-26.52	Average
	2483.500			45.09	74.00	-28.91	Peak Detector
3	2500.000	18.18	17.86	36.04	54.00	-17.96	Average
	2500.000	32.59	17.86	50.45	74.00	-23.55	Peak Detector

10. Conducted Emissions

10.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

10.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-28	2015-05-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-28	2015-05-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-28	2015-05-27

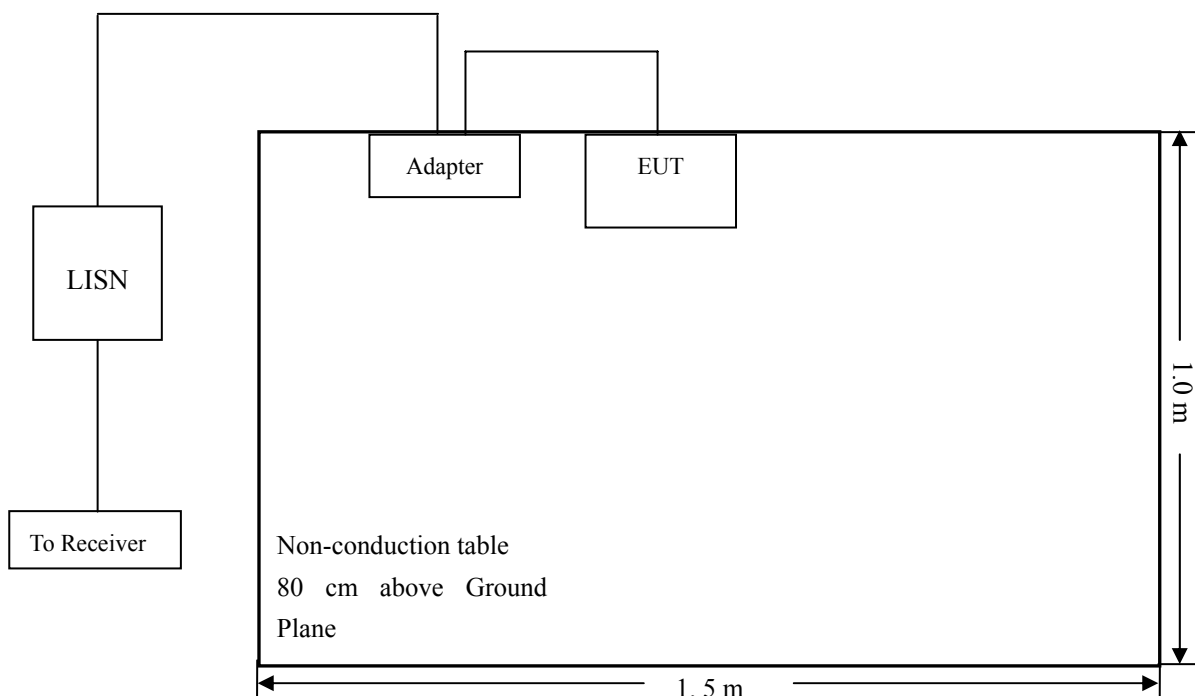
10.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

10.4 Basic Test Setup Block Diagram



10.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

10.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 150 kHz
Stop Frequency..... 30 MHz
Sweep Speed Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth 9 kHz
Quasi-Peak Adapter Mode Normal

10.7 Summary of Test Results/Plots

According to the data in section 9.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

-6.87 dB at 0.182 MHz in the **Line** mode, **Peak** detector, **0.15-30MHz**

10.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

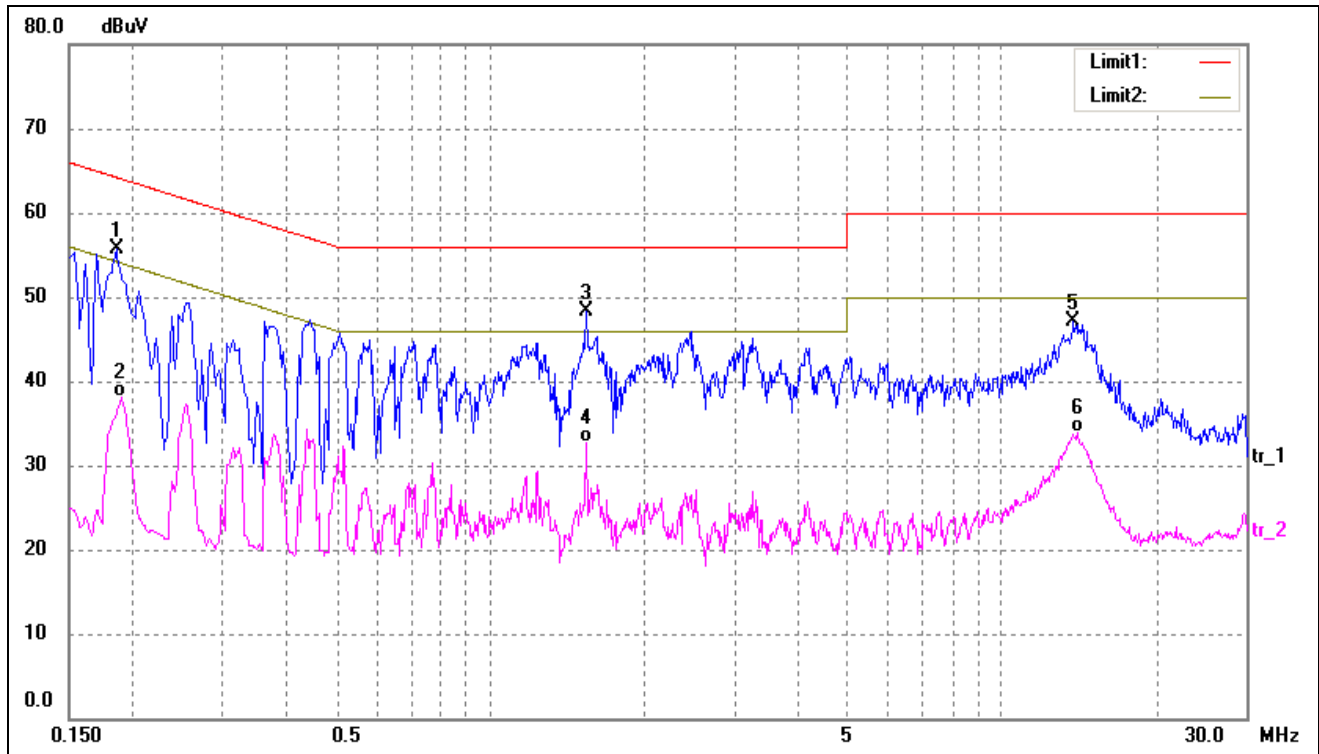
EUT: MID

Tested Model: B26T

Operating Condition: BT Transmitting & Charging

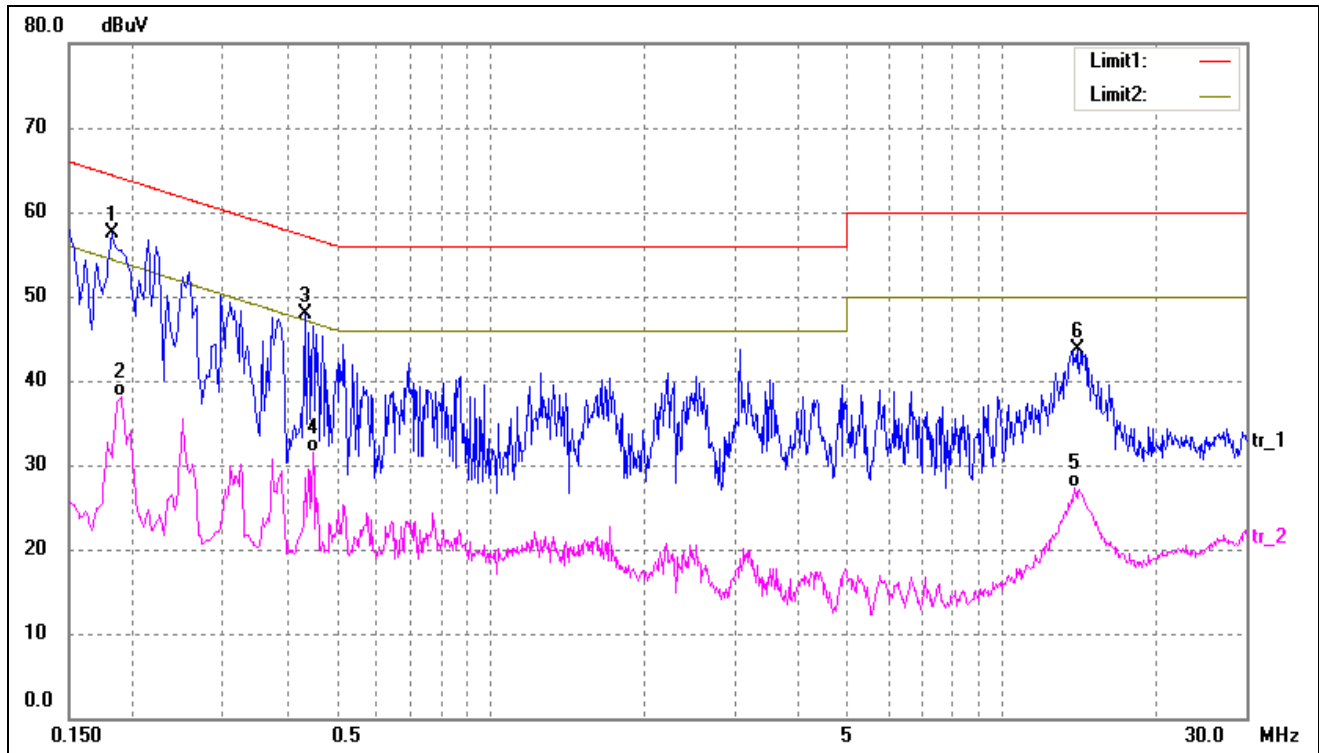
Comment: AC 120V/60Hz; Adapter DC 5V

Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1860	46.12	9.50	55.62	64.21	-8.59	peak
2	0.1900	28.69	9.50	38.19	54.04	-15.85	AVG
3*	1.5380	38.39	10.00	48.39	56.00	-7.61	peak
4	1.5380	22.76	10.00	32.76	46.00	-13.24	AVG
5	13.8020	36.41	10.76	47.17	60.00	-12.83	peak
6	14.0460	23.00	10.81	33.81	50.00	-16.19	AVG

Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1820	48.02	9.50	57.52	64.39	-6.87	peak
2	0.1900	28.57	9.50	38.07	54.04	-15.97	AVG
3	0.4340	38.44	9.50	47.94	57.18	-9.24	peak
4	0.4500	21.94	9.50	31.44	46.88	-15.44	AVG
5	13.9140	16.61	10.78	27.39	50.00	-22.61	AVG
6	14.0980	32.88	10.82	43.70	60.00	-16.30	peak

***** END OF REPORT *****