TEST REPORT

Reference No.	:	WTS19S12084561W002
FCC ID	:	2AVCN-PRE1X6
Applicant.....	:	PVS N.V.
Address.....	:	Veldstraat 99 3500 Hasselt, Belgium
Manufacturer	:	PVS N.V.
Address.....	:	Veldstraat 99 3500 Hasselt, Belgium
Product.....	:	6 CHANNEL PRE AMPLIFIER
Model(s)	:	PRE126, PRE116
Standards.....	:	FCC CFR47 Part 15 Section 15.247:2019
Date of Receipt sample	:	2019-12-06
Date of Test	:	2019-12-06 to 2019-12-27
Date of Issue.....	:	2019-12-30
Test Result.....	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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2 Revision History

Test Report No.	Date of Receipt Sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS19S12084561W002	2019-12-06	2019-12-06 to 2019-12-27	2019-12-30	original	-	Valid

3 General Information

3.1 General Description of E.U.T.

Product:	6 CHANNEL PRE AMPLIFIER
Model(s):	PRE126, PRE116
Model difference:	Both models are use the same Bluetooth module, only the output channels and appearance are different.
Remark:	Both models are the tested sample, only the worst test data which were recorded in this report.
Bluetooth Version:	4.0
Operation Frequency:	2402-2480MHz, 79 Channels in total for EDR, 40 Channels in total for BLE
Antenna installation:	External Antenna with RP-SMA connector
Antenna Gain:	2.0 dBi
Type of Modulation:	GFSK, π/4DQPSK, 8DPSK

3.2 Details of E.U.T.

Ratings: 100-240V~, 50/60Hz, 12W

3.3 Channel List

Bluetooth LE

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	1	2404	2	2406	3	2408
4	2410	5	2412	6	2414	7	2416
8	2418	9	2420	10	2422	11	2424
12	2426	13	2428	14	2430	15	2432
16	2434	17	2436	18	2438	19	2440
20	2442	21	2444	22	2446	23	2448
24	2450	25	2452	26	2454	27	2456
28	2458	29	2460	30	2462	31	2464
32	2466	33	2468	34	2470	35	2472
36	2474	37	2476	38	2478	39	2480

3.4 Test Mode

Table 2 Tests carried out under FCC part 15.247

Bluetooth LE Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	Bluetooth LE	1 Mbps	0/19/39	TX
Power Spectral Density	Bluetooth LE	1 Mbps	0/19/39	TX
Bandwidth	Bluetooth LE	1 Mbps	0/19/39	TX
Band Edge	Bluetooth LE	1 Mbps	0/19/39	TX
Radiated Spurious Emissions	Bluetooth LE	1 Mbps	0/19/39	TX

Note: Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product.

4 Equipment Used during Test

4.1 Equipments List

Conducted Emissions						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	EMI Test Receiver	R&S	ESCI	101155	2019-09-17	2020-09-16
2	LISN	SCHWARZBECK	NSLK 8128	8128-259	2019-09-17	2020-09-16
3	Limiter	CYBERTEK	EM5010	261115-001-0024	2019-09-17	2020-09-16
4	Cable	Laplace	RF300	-	2019-09-17	2020-09-16
3m Semi-anechoic Chamber for Radiation Emissions(SAEMC)						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP30	100091	2019-04-19	2020-04-18
2	Broad-band Horn Antenna(1-18GHz)	SCHWARZBECK	BBHA 9120 D	667	2019-04-19	2020-04-18
3	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2019-04-19	2020-04-18
4	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	EW02014-7	2019-04-19	2020-04-18
5	Spectrum Analyzer	R&S	FSP40	100501	2019-09-17	2020-09-16
6	Broad-band Horn Antenna(18-40GHz)	SCHWARZBECK	BBHA 9170	335	2019-09-17	2020-09-16
7	Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	100472	2019-09-17	2020-09-16
8	Cable	Top	18-40GHz	-	2019-09-17	2020-09-16
3m Semi-anechoic Chamber for Radiation Emissions(TDK)						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	2019-04-20	2020-04-19
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2019-05-24	2020-05-23
3	Active Loop Antenna	Com-power	AL-130R	10160007	2019-04-28	2020-04-27
4	Amplifier	ANRITSU	MH648A	M43381	2019-04-19	2020-04-18
5	Cable	HUBER+SUHNER	CBL2	525178	2019-04-20	2020-04-19

6	Coaxial Cable (below 1GHz)	Top	TYPE16 (13M)	-	2019-09-12	2020-09-11
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP40	100501	2019-09-17	2020-09-16
2	Coaxial Cable	Top	10Hz-30GHz	-	2019-09-12	2020-09-11
3	Antenna Connector*	Realacc	45RSm	-	2019-09-12	2020-09-11
4	DC Block	Gwave	GDCB-3G-N-SMA	140307001	2019-09-12	2020-09-11
"*": The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.						

4.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-6}
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

4.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave, Tianhe District, Guangzhou, Guangdong, China.

5 Test Facility

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.
ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

6 Test Summary

Test Items	Test Requirement	Result
Radiated Spurious Emissions	15.247(d) 15.205(a) 15.209(a)	Pass
Conducted Emissions	15.207(a)	Pass
Bandwidth	15.247(a)(2)	Pass
Maximum Peak Output Power	15.247(b)(3),(4)	Pass
Power Spectral Density	15.247(e)	Pass
Band Edge	15.247(d)	Pass
Antenna Requirement	15.203	Pass
RF Exposure	1.1307(b)(1)	Pass
Note: Pass=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable.		

7 Conducted Emission

Test Requirement: FCC CFR 47 Part 15 Section 15.207

Test Method: ANSI C63.10:2013

Test Result: PASS

Frequency Range: 150kHz to 30MHz

Class/Severity: Class B

Limit:

Frequency (MHz)	Conducted imit (dBμV)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5.0	56	46
5.0 to 30	60	50
*Decreases wi h the logar thm of the frequency.		

7.1 E.U.T. Operation

Operating Environment **:**

Temperature: 22.7 °C

Humidity: 54.3 % RH

Atmospheric Pressure: 101.5kPa

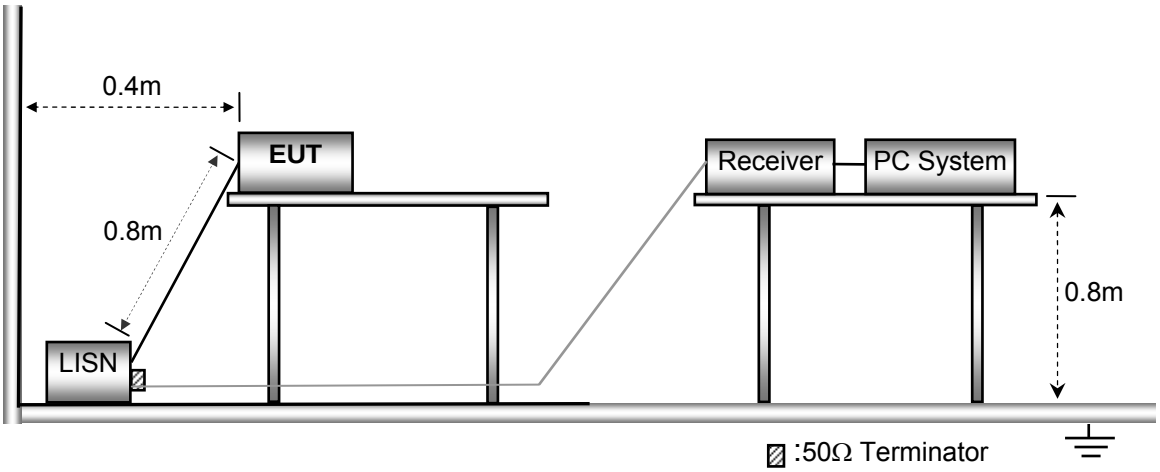
Test Voltage: AC 120V, 60Hz

EUT Operation :

The test was performed in Transmitting mode, the worst test data (Low channel) were shown in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



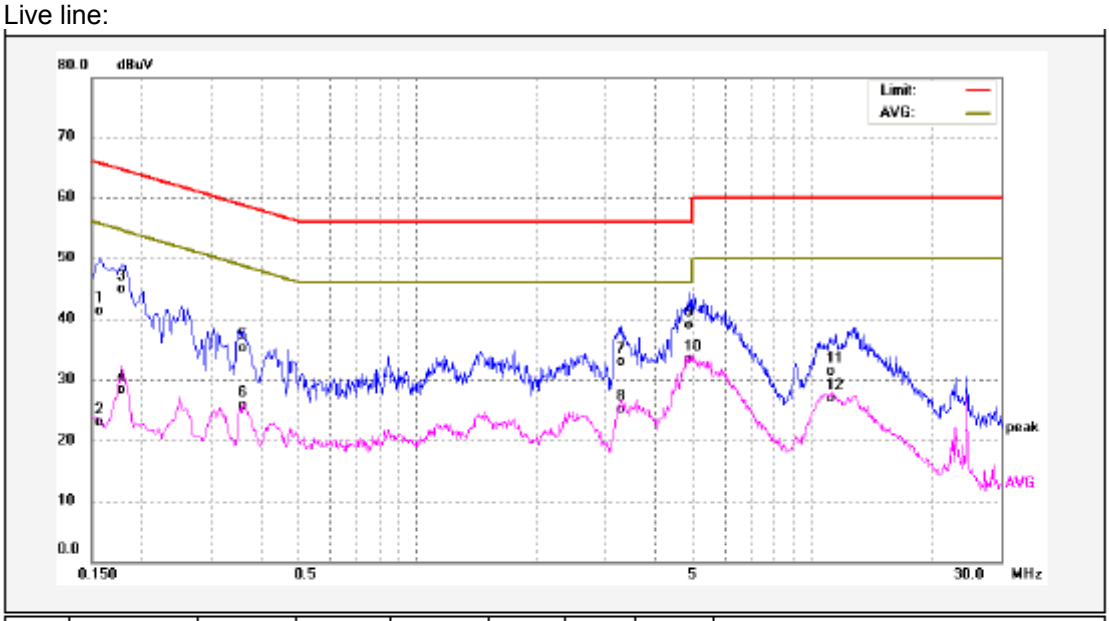
7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

7.4 Conducted Emission Test Result

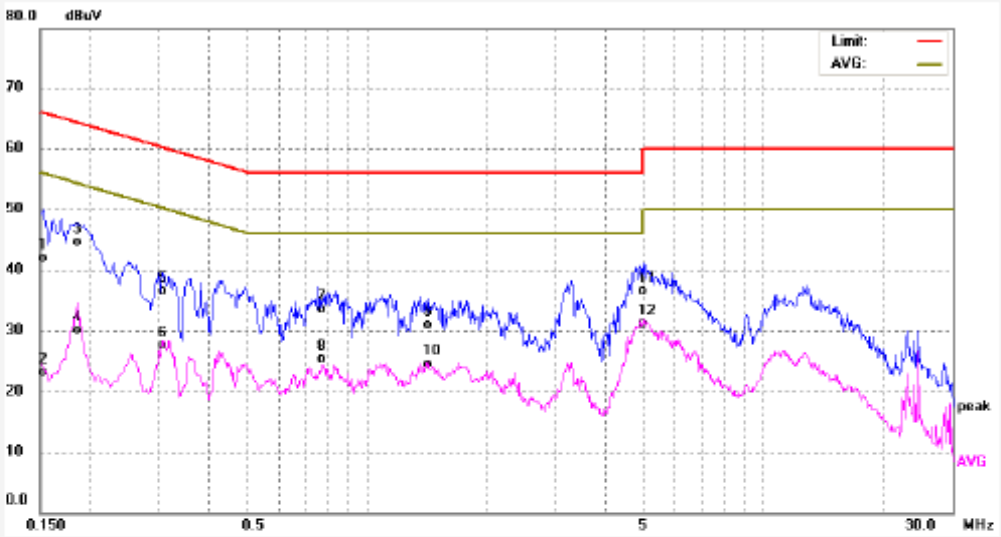
Remark: only the worst test data (Low channel) were shown in the report.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1580	31.01	10.27	41.28	65.56	-24.28	QP	
2	0.1580	12.70	10.27	22.97	55.56	-32.59	AVG	
3	0.1780	34.61	10.30	44.91	64.57	-19.66	QP	
4	0.1780	18.00	10.30	28.30	54.57	-26.27	AVG	
5	0.3620	24.60	10.42	35.02	58.68	-23.66	QP	
6	0.3620	15.34	10.42	25.76	48.68	-22.92	AVG	
7	3.2860	22.26	10.72	32.98	56.00	-23.02	QP	
8	3.2860	14.47	10.72	25.19	46.00	-20.81	AVG	
9	4.8940	28.18	10.81	38.99	56.00	-17.01	QP	
10	4.8940	22.51	10.81	33.32	46.00	-12.68	AVG	
11	11.0980	20.06	11.15	31.21	60.00	-28.79	QP	
12	11.0980	15.78	11.15	26.93	50.00	-23.07	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	31.70	10.27	41.97	65.78	-23.81	QP	
2	0.1539	12.84	10.27	23.11	55.78	-32.67	AVG	
3	0.1860	34.29	10.31	44.60	64.21	-19.61	QP	
4	0.1860	19.86	10.31	30.17	54.21	-24.04	AVG	
5	0.3060	26.00	10.41	36.41	60.08	-23.67	QP	
6	0.3060	17.16	10.41	27.57	50.08	-22.51	AVG	
7	0.7740	23.05	10.44	33.49	56.00	-22.51	QP	
8	0.7740	14.77	10.44	25.21	46.00	-20.79	AVG	
9	1.4260	20.47	10.47	30.94	56.00	-25.06	QP	
10	1.4260	13.97	10.47	24.44	46.00	-21.56	AVG	
11	5.0020	25.63	10.81	36.44	60.00	-23.56	QP	
12	5.0020	20.39	10.81	31.20	50.00	-18.80	AVG	

8 Radiated Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment **:**

Temperature: 23.4 °C

Humidity: 53.7 % RH

Atmospheric Pressure: 101.3kPa

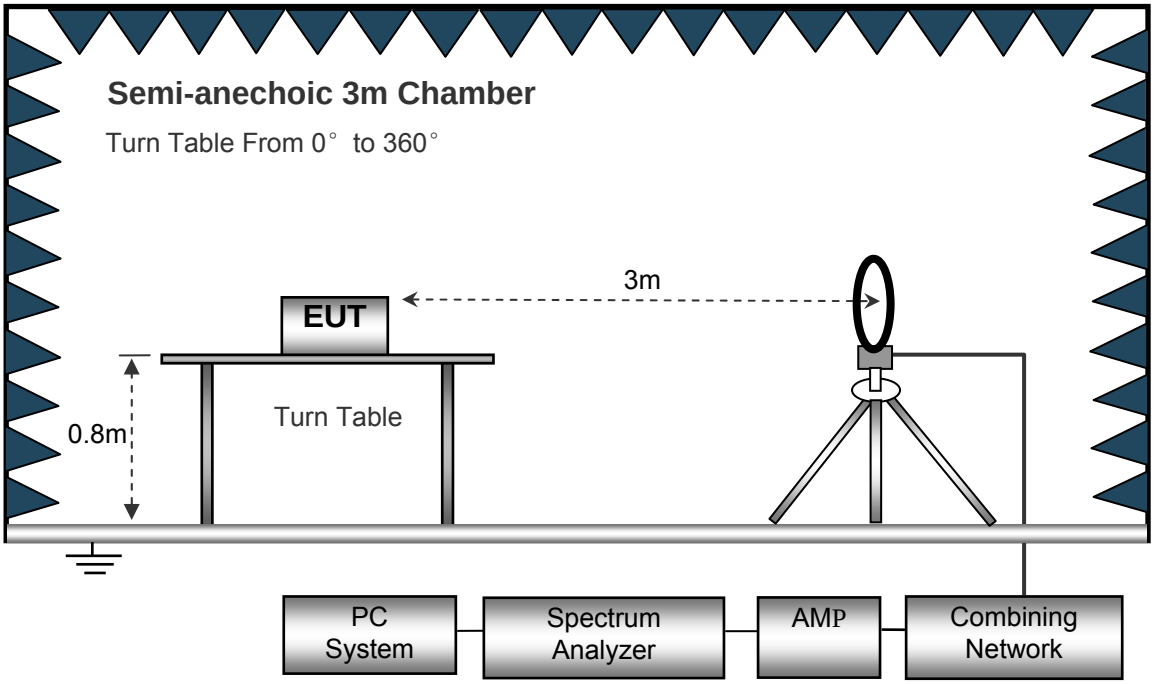
EUT Operation **:**

The test was performed in Transmitting mode, the test data were shown in the report.

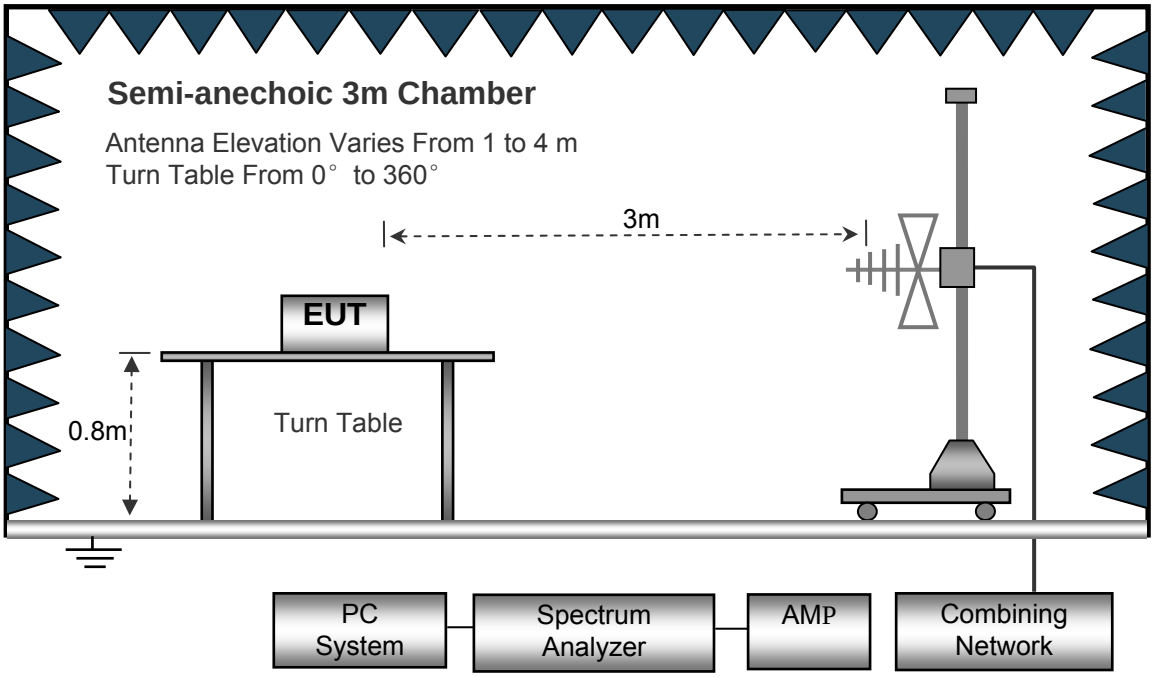
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10:2013.

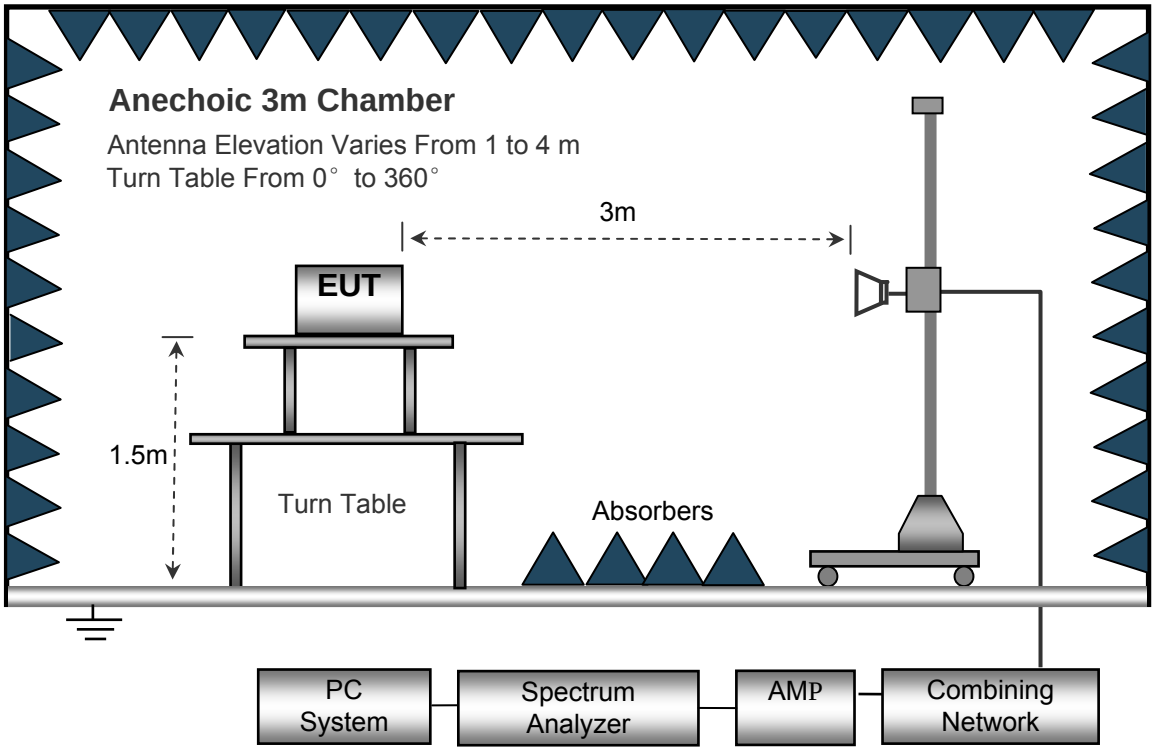
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed ..... Auto
IF Bandwidth..... 10kHz
Video Bandwidth..... 10kHz
Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 3MHz
Detector ..... Ave.
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 10Hz

8.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X, Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), the worst condition was tested putting the eut in X axis, so the worst data were shown as follow.

8.5 Corrected Amplitude & Margin Calculation

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

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Limit

8.6 Summary of Test Results

Test Frequency: 9 kHz ~ 25 GHz

Only the worst case GFSK mode and the worst frequency test data were recorded in the report, other frequency are attenuated more than 20 dB below the permissible value and not reported.

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/ Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Low Channel 2402MHz									
30.45	35.69	QP	185	1.6	H	-7.24	28.45	40.00	-11.55
30.45	38.26	QP	297	1.3	V	-7.24	31.02	40.00	-8.98
4804.00	54.97	PK	194	1.2	V	-1.06	53.91	74.00	-20.09
4804.00	47.73	Ave	194	1.2	V	-1.06	46.67	54.00	-7.33
7206.00	52.34	PK	257	1.8	H	1.33	53.67	74.00	-20.33
7206.00	46.15	Ave	257	1.8	H	1.33	47.48	54.00	-6.52
2312.65	44.75	PK	91	1.9	V	-13.19	31.56	74.00	-42.44
2312.65	35.34	Ave	91	1.9	V	-13.19	22.15	54.00	-31.85
2350.29	43.98	PK	186	1.2	H	-13.14	30.84	74.00	-43.16
2350.29	32.19	Ave	186	1.2	H	-13.14	19.05	54.00	-34.95
2498.95	42.52	PK	315	1.9	V	-13.08	29.44	74.00	-44.56
2498.95	32.72	Ave	315	1.9	V	-13.08	19.64	54.00	-34.36

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/ Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Middle Channel 2440MHz									
30.45	35.47	QP	333	1.4	H	-7.24	28.23	40.00	-11.77
30.45	37.69	QP	343	2.0	V	-7.247	30.45	40.00	-9.55
4880.00	54.59	PK	8	1.1	V	-0.62	53.97	74.00	-20.03
4880.00	46.82	Ave	8	1.1	V	-0.62	46.20	54.00	-7.80
7320.00	51.69	PK	215	1.7	H	2.21	53.90	74.00	-20.10
7320.00	45.03	Ave	215	1.7	H	2.21	47.24	54.00	-6.76
2344.64	45.47	PK	212	1.6	V	-13.19	32.28	74.00	-41.72
2344.64	35.07	Ave	212	1.6	V	-13.19	21.88	54.00	-32.12
2356.08	44.63	PK	263	1.2	H	-13.14	31.49	74.00	-42.51
2356.08	33.28	Ave	263	1.2	H	-13.14	20.14	54.00	-33.86
2497.85	44.13	PK	168	1.9	V	-13.08	31.05	74.00	-42.95
2497.85	33.41	Ave	168	1.9	V	-13.08	20.33	54.00	-33.67

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dBμV)	(PK/QP/ Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK High Channel 2480MHz									
30.45	35.32	QP	267	1.2	H	-7.24	28.08	46.00	-11.92
30.45	37.28	QP	279	1.5	V	-7.24	30.04	46.00	-9.96
4960.00	54.00	PK	187	1.5	V	-0.24	53.76	74.00	-20.24
4960.00	47.83	Ave	187	1.5	V	-0.24	47.59	54.00	-6.41
7440.00	50.33	PK	308	1.7	H	2.84	53.17	74.00	-20.83
7440.00	43.73	Ave	308	1.7	H	2.84	46.57	54.00	-7.43
2338.20	45.25	PK	67	1.5	V	-13.19	32.06	74.00	-41.94
2338.20	35.54	Ave	67	1.5	V	-13.19	22.35	54.00	-31.65
2364.17	42.46	PK	307	1.5	H	-13.14	29.32	74.00	-44.68
2364.17	33.83	Ave	307	1.5	H	-13.14	20.69	54.00	-33.31
2493.12	43.72	PK	95	1.6	V	-13.08	30.64	74.00	-43.36
2493.12	33.28	Ave	95	1.6	V	-13.08	20.20	54.00	-33.80

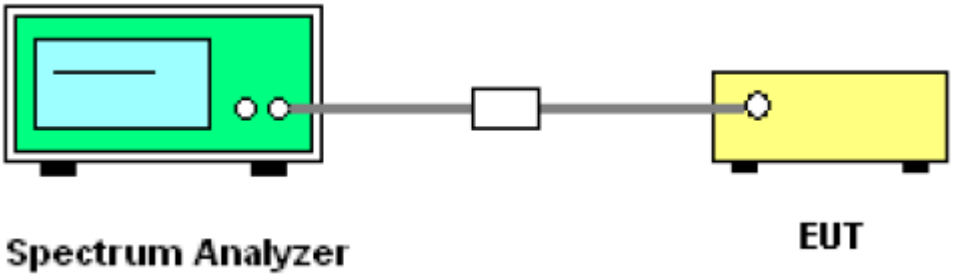
9 Band Edge Measurement

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	558074 D01 15.247 Meas Guidance v05r02, ANSI C63.10:2013
Test Limit:	Regulation 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) (see §15.205(c)).
Test Mode:	Transmitting

9.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

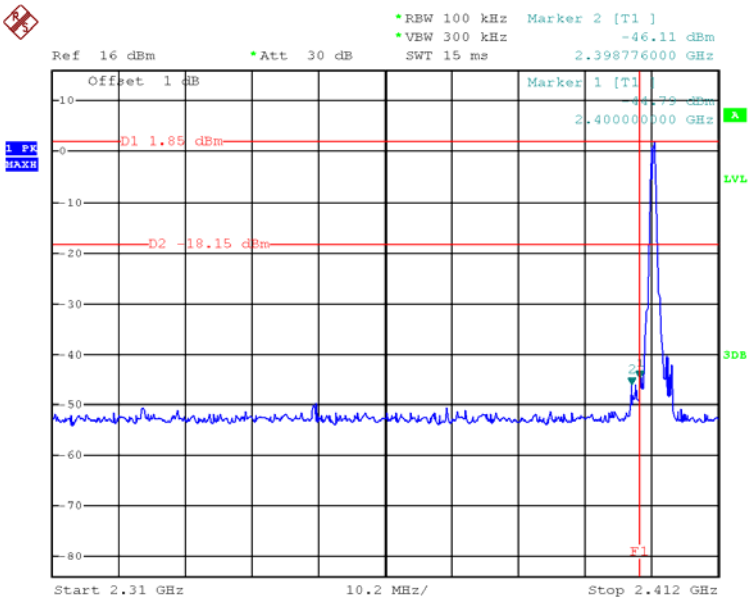
9.2 Test Setup



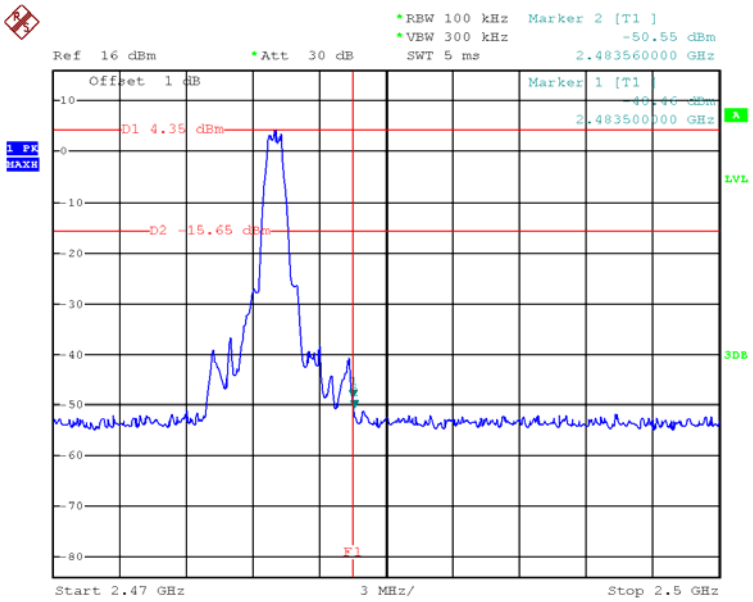
9.3 Test Result

Test result plots shown as follows:

Bluetooth LE: Band edge-left side



Bluetooth LE: Band edge-right side



10 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

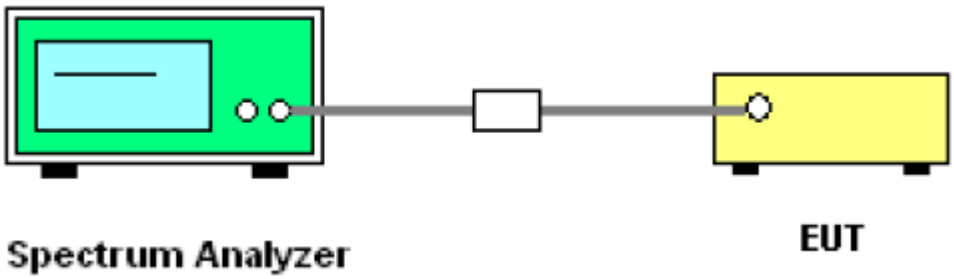
Test Method: 558074 D01 15.247 Meas Guidance v05r02, ANSI C63.10:2013

10.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

2. Set the spectrum analyzer: RBW = 100 kHz, VBW = 300 kHz

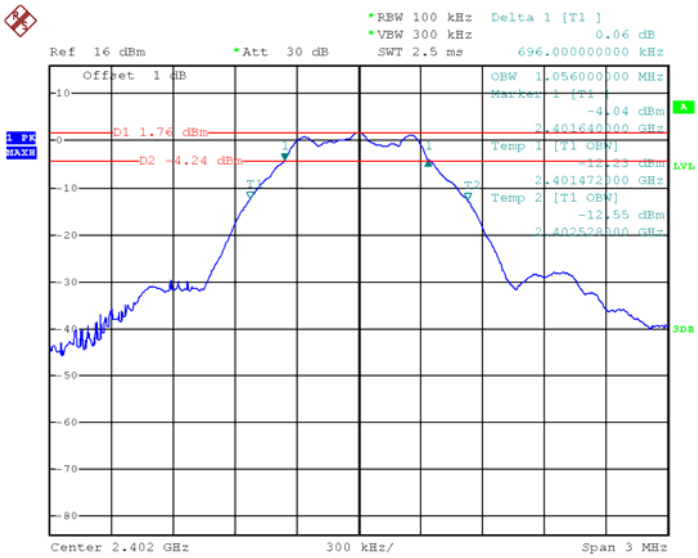
10.2 Test Setup



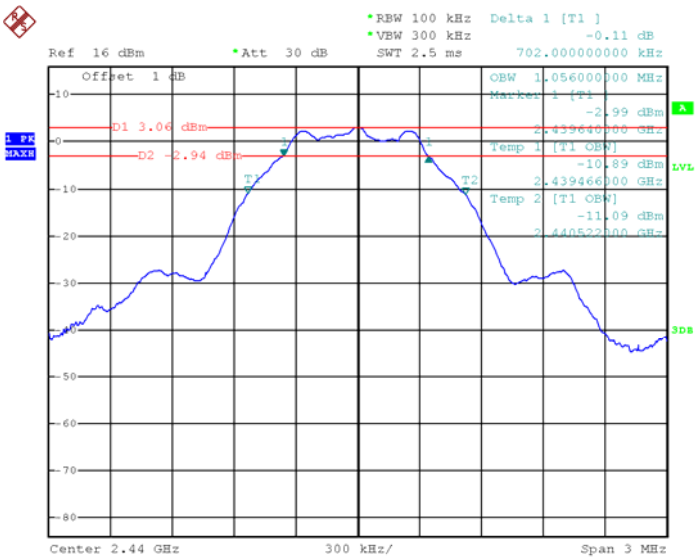
10.3 Test Result:

Operation mode	Test Channel	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
Bluetooth LE	Channel 0	0.696	1.056
	Channel 19	0.702	1.056
	Channel 39	0.696	1.056

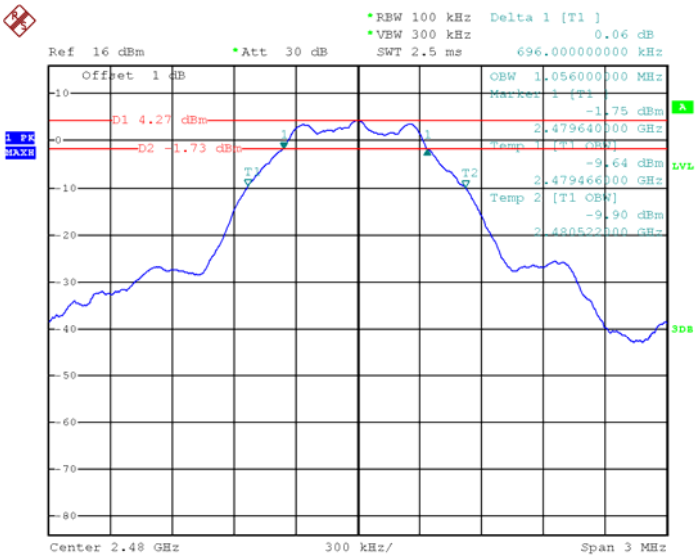
Bluetooth LE: channel 0



Bluetooth LE: channel 19



Bluetooth LE: channel 39



11 Maximum Peak Output Power

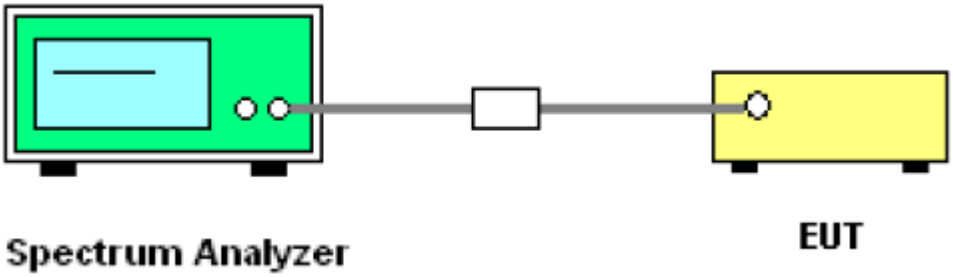
Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05r02, ANSI C63.10:2013

11.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

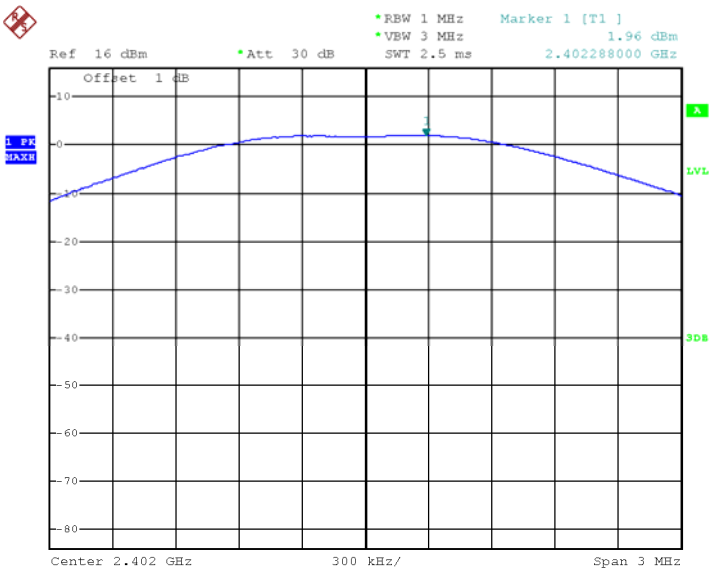
11.2 Test Setup



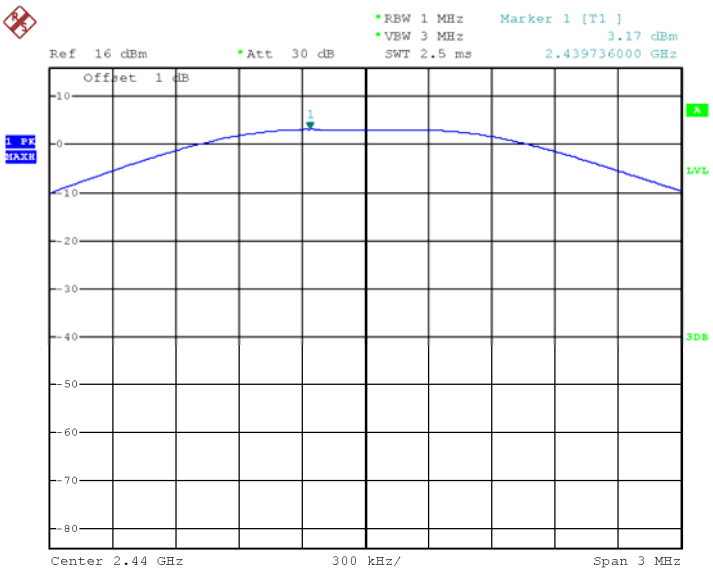
11.3 Test Result:

Operation mode	Test Channel	Maximum Peak Output Power (dBm)	Limit
Bluetooth LE	Channel 0	1.96	1W/30dBm
	Channel 19	3.17	1W/30dBm
	Channel 39	**4.33**	1W/30dBm

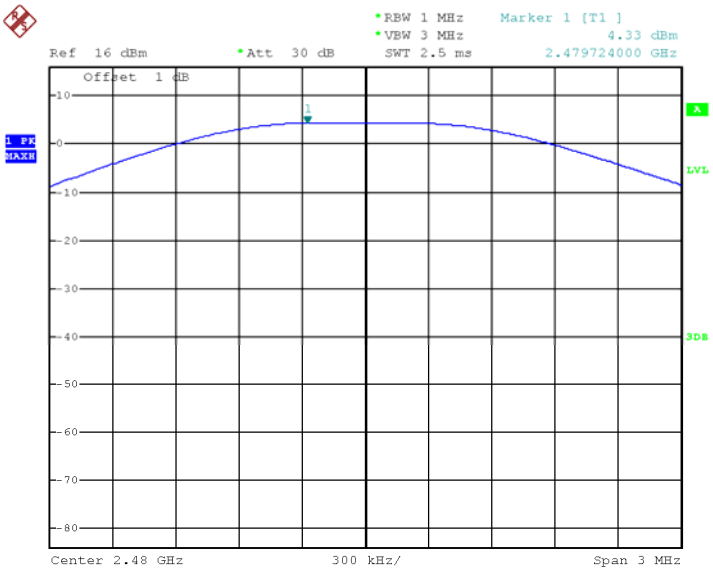
Bluetooth LE: channel 0



Bluetooth LE: channel 19



Bluetooth LE: channel 39



]

12 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05r02, ANSI C63.10:2013

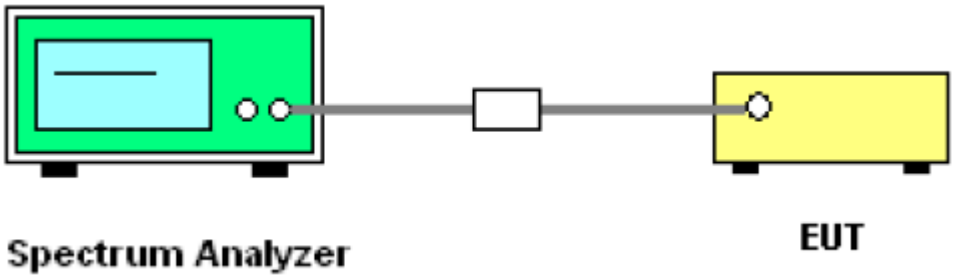
12.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

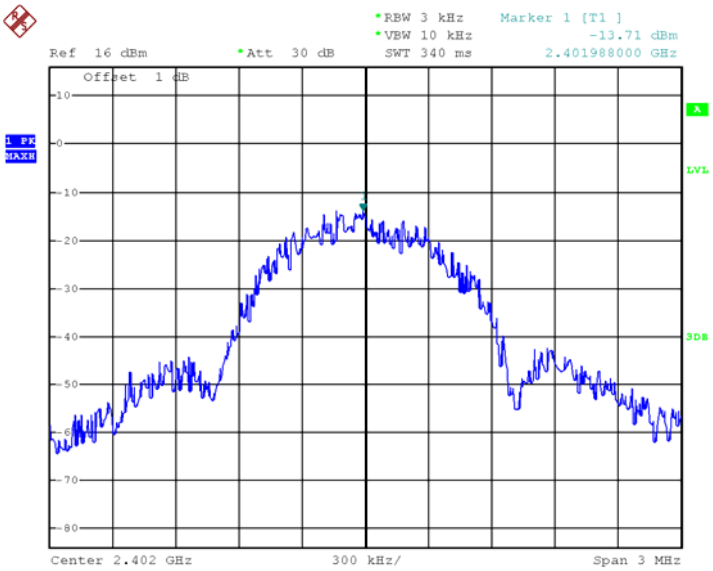
12.2 Test Setup



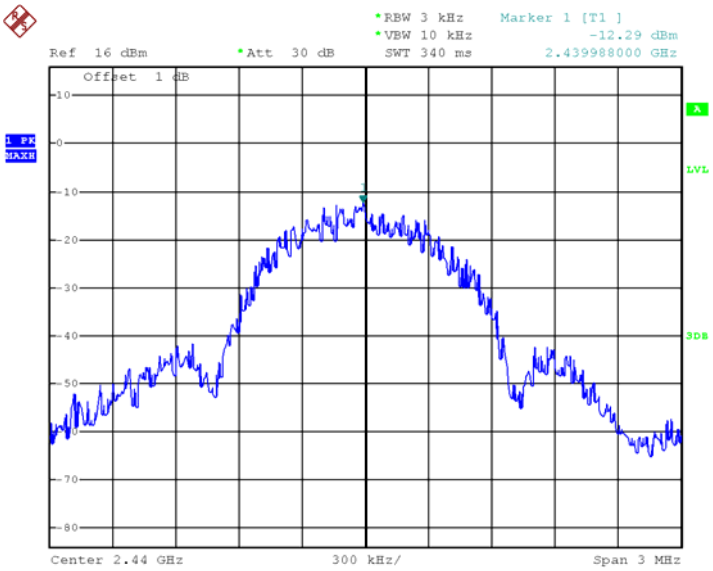
12.3 Test Result:

Operation mode	Test Channel	Power Spectral (dBm per 3kHz)	Limit
Bluetooth LE	Channel 0	-13.71	8dBm per 3kHz
	Channel 19	-12.29	8dBm per 3kHz
	Channel 39	-10.95	8dBm per 3kHz

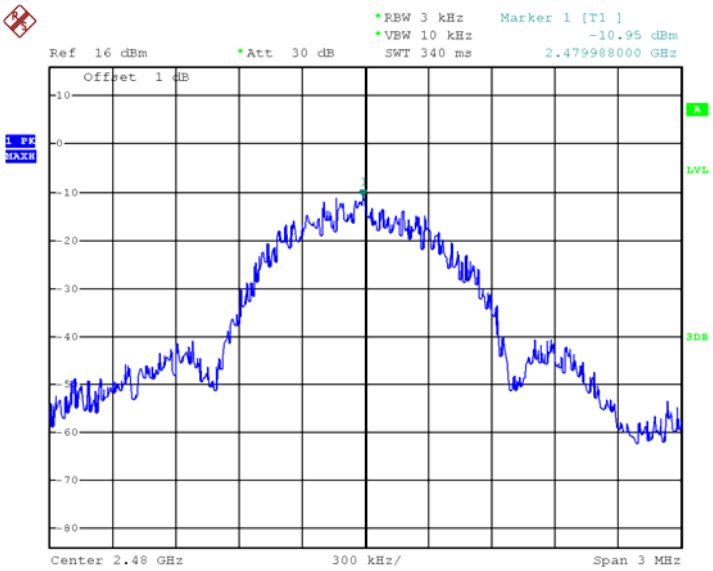
Bluetooth LE: channel 0



Bluetooth LE: channel 19



Bluetooth LE: channel 39



13 Antenna Requirement

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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 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.

Result:

The EUT has a External Antenna with RP-SMA connector for Bluetooth Antenna, meets the requirements of FCC 15.203.

14 FCC ID: 2AVCN-PRE1X6 RF Exposure Report

Test Requirement: FCC Part 1.1307

Evaluation Method FCC Part2.1093 & KDB 447498 D01 General RF Exposure Guidance v06

14.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

14.2 The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz; *Plane-wave equivalent power density

14.3 MPE Calculation Method

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

S = power density (in appropriate units, e.g. mW/cm^2)
P = output power to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

From the peak EUT RF output power, the minimum mobile separation distance, R=20cm, as well as the gain of the used antenna, the RF power density can be obtained

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. conducted Output Power (dBm)	Max. conducted Output Power (mW)	Power Density (mW/cm2)	Limit of Power Density (mW/cm2)	Result
2.0	1.585	4.33	2.71	0.000855	1	Compliance

14.4 Result: Compliance

No SAR measurement is required.

15 Photographs –Test Setup Photos

15.1 Photograph-Conducted Emissions Test Setup Photos

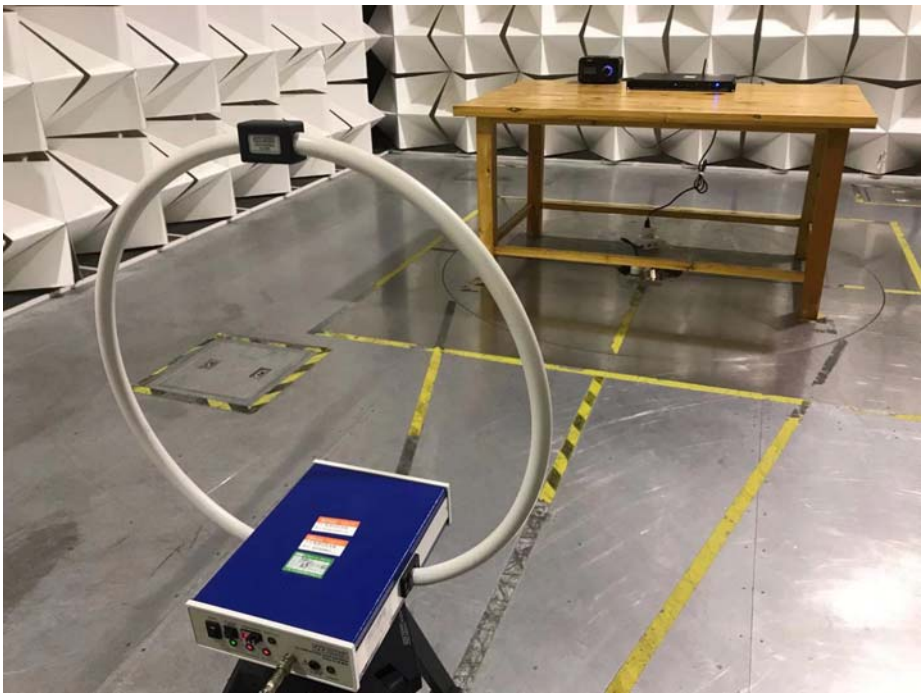
Model: PRE126

Model: PRE116

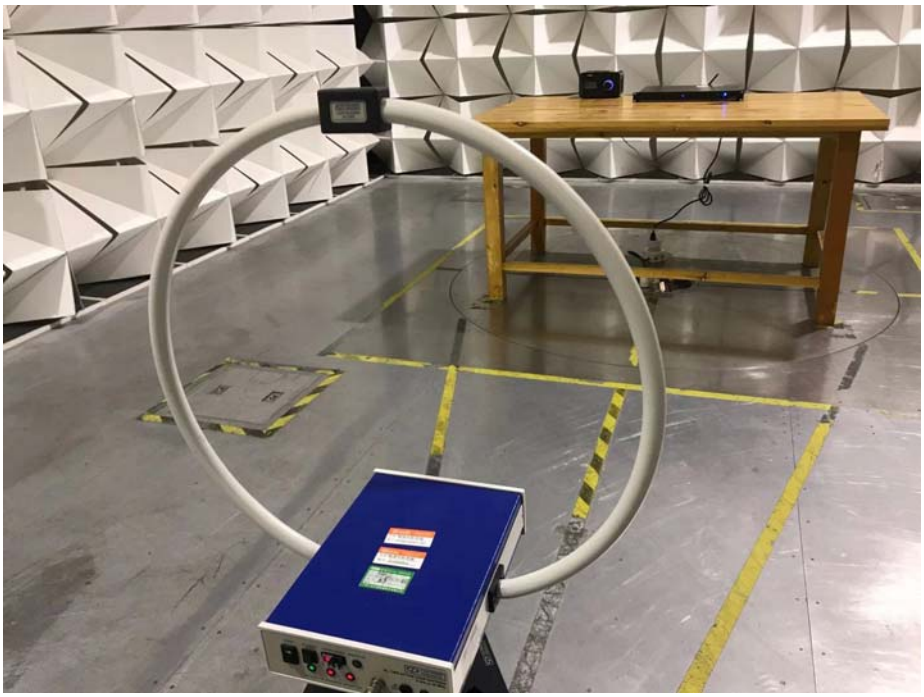
15.2 Photograph – Radiation Spurious Emission Test Setup Photos

9 kHz to 30 MHz

Model: PRE126

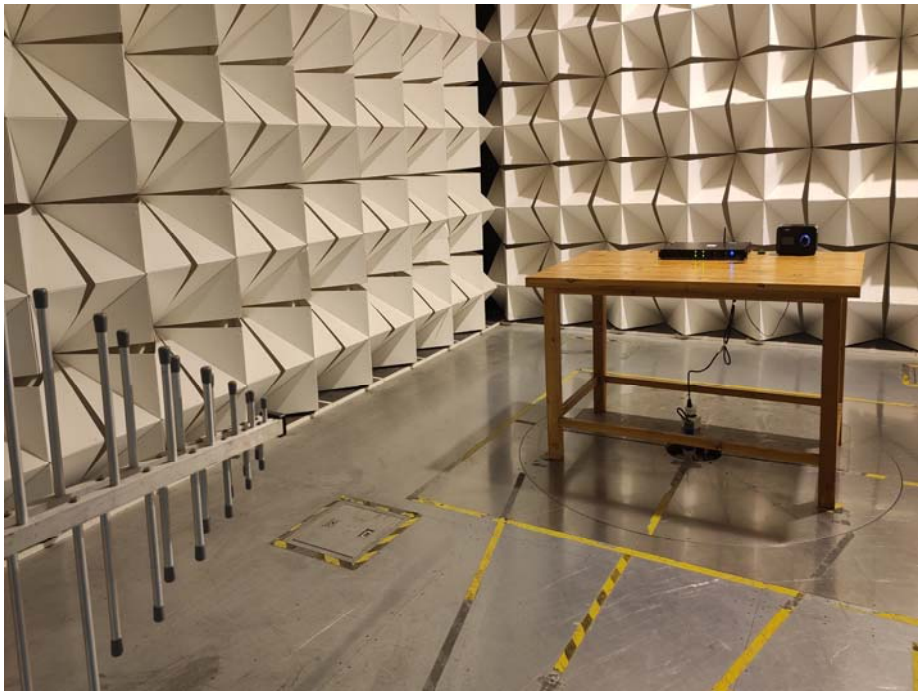


Model: PRE116

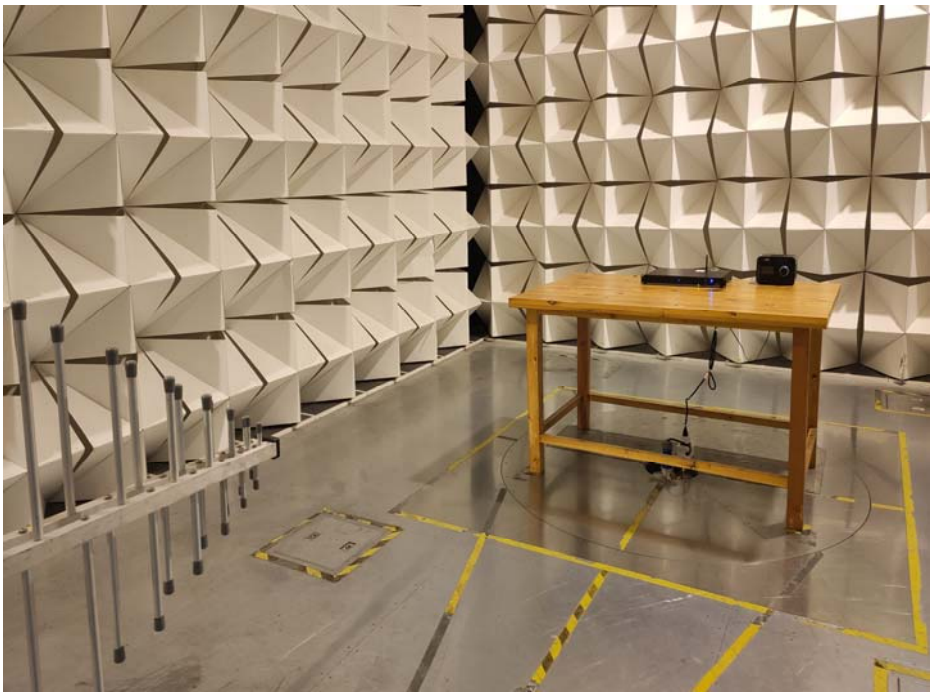


30 MHz to 1GHz

Model: PRE126



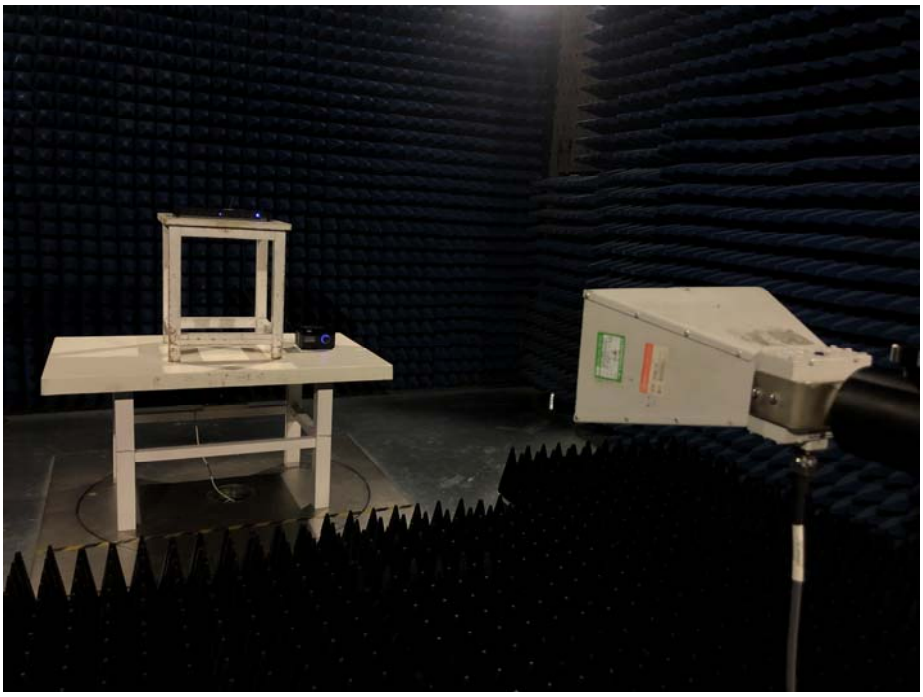
Model: PRE116



Above 1GHz

Model: PRE126

Model: PRE116



16 Photographs - Constructional Details

16.1 EUT- External Photos

Refer to Appendix PRE126&PRE116 Photos.

16.2 EUT - Internal Photos

Refer to Appendix PRE126&PRE116 Photos.

======End of Report======