

# TEST REPORT

**Reference No.**..... : WTS19S11080405W001 V1  
**FCC ID** ..... : ZLZ-PANLINK3  
**Applicant**..... : Shenzhen Mindray Bio-Medical Electronics Co.,Ltd.  
**Address**..... : Mindray Building, Keji 12th Road South, High-tech Industrial Park,  
Nanshan, 518057 Shenzhen,PEOPLE'S REPUBLIC OF CHINA  
**Manufacturer** ..... : The same as above  
**Address**..... : The same as above  
**Product**..... : Bluetooth module  
**Model(s)** ..... : panlink3  
**Brand Name** ..... : Mindray  
**Standards**..... : FCC CFR47 Part 15.247:2018  
**Date of Receipt sample** .... : 2019-11-20  
**Date of Test** ..... : 2019-11-21 to 2020-04-16  
**Date of Issue**..... : 2020-06-12  
**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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### 3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS19S11080 405W001	2019-11-20	2019-11-21 to 2020-04- 16	2020-04-17	original	-	Replaced
WTS19S11080 405W001 V1	2019-11-20	2019-11-21 to 2020-04- 16	2020-06-12	Version 1	Updated	Valid

## 4 General Information

### 4.1 General Description of E.U.T.

Product:	Bluetooth module
Model(s):	panlink3
Model Description:	N/A
Bluetooth Version:	Bluetooth V5.0
Hardware Version:	1.0
Software Version:	1.0
Highest frequency (Exclude Radio):	32MHz
Storage Location:	Internal Storage
Note:	N/A

### 4.2 Details of E.U.T.

Operation Frequency:	BLE:2402-2480MHz
Max. RF output power:	BLE:6.78dBm [manufacturers advertise rated power: 8dBm( $\pm$ 4dBm)]
Type of Modulation:	BLE:GFSK
Antenna installation:	BLE: Externally connected antenna
Antenna Type:	ANT1: FPC dipole; ANT2: FPC PIFA; ANT3: copper pipe dipole; ANT4: FPC dipole; ANT5: PCB PIFA; ANT6: FPC PIFA
Antenna Gain:	BLE: ANT1: 2.0dBi; ANT2: 1.0dBi; ANT3: 3.53dBi; ANT4: 2.0dBi; ANT5: 1.0dBi; ANT6: 0.64dBi
Ratings:	DC 1.75~3.6V

### 4.3 Channel List

#### BLE

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

#### 4.4 Test Mode

Table 2 Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	BT BLE	2 Mbps	0/19/39	TX
Power Spectral Density	BT BLE	2 Mbps	0/19/39	TX
6dB Bandwidth	BT BLE	2 Mbps	0/19/39	TX
Band Edge	BT BLE	2 Mbps	0/19/39	TX
Transmitter Spurious Emissions	BT BLE	2 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 .

#### 4.5 Test Facility

The test facility has a test site registered with the following organizations:

**ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.**

Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files.

Registration number 7760A, October 15, 2016.

**FCC Designation No.: CN1201. Test Firm Registration No.: 523476.**

Waltek Services(Shenzhen) 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. Registration number 523476, September 10, 2019.

## 5 Test Summary

Test Items	Test Requirement	Result
Radiated Spurious Emissions	15.247(d) 15.205(a) 15.209(a)	PASS
Conducted Spurious Emissions	15.247(d)	PASS
Conducted Emissions	15.207(a)	NA
6dB 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
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

Note: All test were performed that the device transmit continue of the 100% duty cycle.

## 6 Equipment Used during Test

### 6.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	2019-09-12	2020-09-11
2.	LISN	R&S	ENV216	101215	2019-09-12	2020-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2019-09-12	2020-09-11
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	2019-09-12	2020-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2019-09-12	2020-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2019-09-12	2020-09-11
4.	Cable	LARGE	RF300	-	2019-09-12	2020-09-11
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	2019-04-29	2020-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2020-04-09	2021-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2020-04-09	2021-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2019-09-12	2020-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2020-04-09	2021-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2020-04-09	2021-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2020-04-13	2021-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2020-04-13	2021-04-12
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2020-04-13	2021-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2020-04-09	2021-04-08
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2020-04-13	2021-04-12
4	Cable	HUBER+SUHNER	CBL2	525178	2020-04-13	2021-04-12



RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2019-09-12	2020-09-11
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2019-09-12	2020-09-11
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2019-09-12	2020-09-11

## 6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

## 6.3 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64 dB(AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	± 1 x 10 <sup>-7</sup> Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~26500MHz)
Confidence interval: 95%. Confidence factor:k=2	

## 6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

## 7 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019;  
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	$20\log^{(500)}$

### 7.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

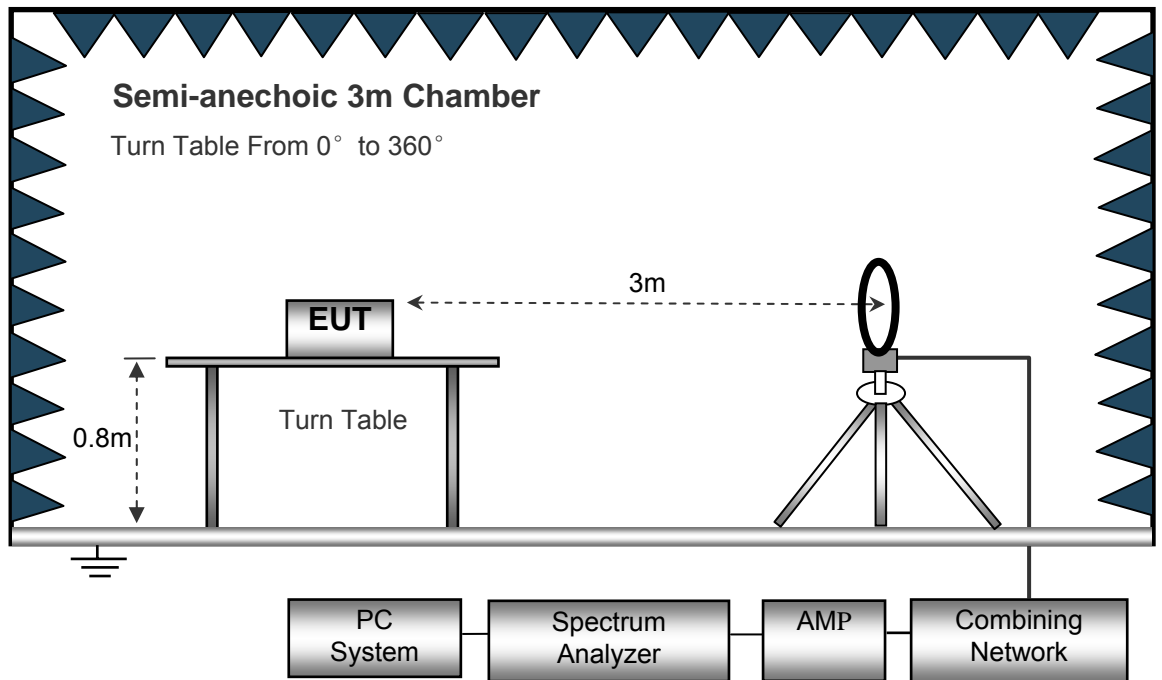
EUT Operation :

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

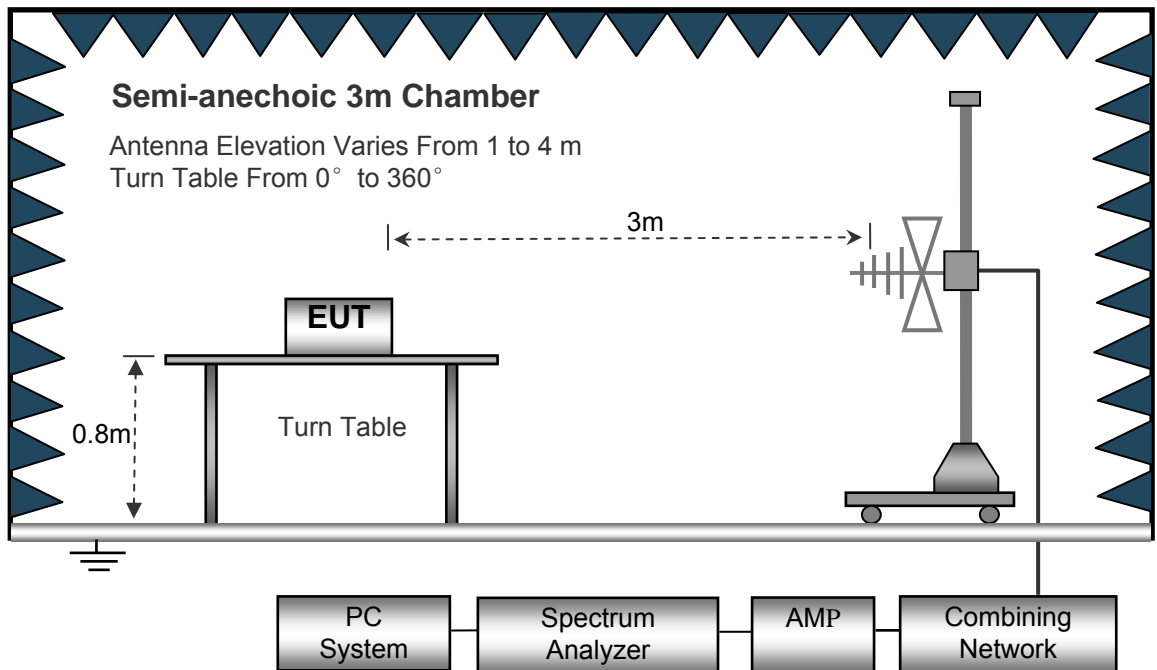
## 7.2 Test Setup

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

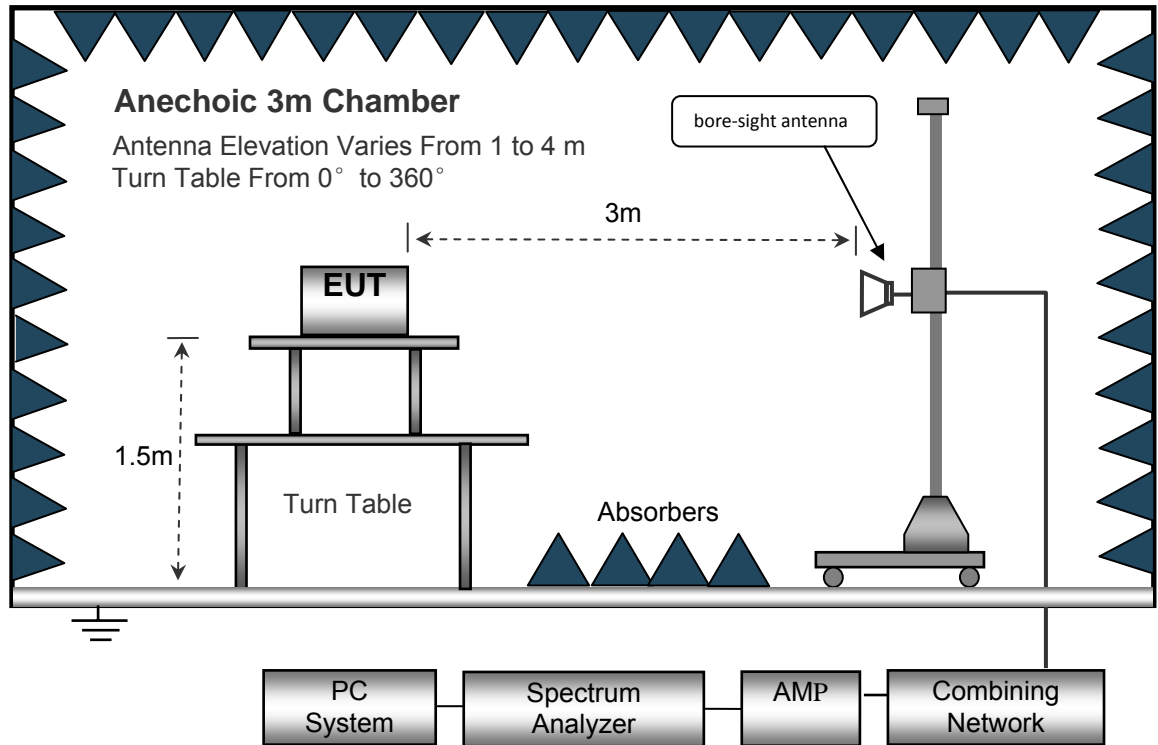
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



### 7.3 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..... 3MHz

## 7.4 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 Z axis,so the worst data were shown as follow.
8. A 2.4GHz high -pass filter is used during radiated emissions above 1GHz measurement.

## 7.5 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:

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

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:

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

## 7.6 Summary of Test Results

### BT BLE:

**Test Frequency: 9KHz~26MHz**

Remark: only the worst data (GFSK modulation Low channel mode) were recorded.

#### ANT1

Frequency	Measurement results dB $\mu$ V @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dB $\mu$ V/m @30m	Limits dB $\mu$ V/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
6.021	25.31	QP	21.84	40.00	7.15	29.54	-22.39
15.730	24.87	QP	21.35	40.00	6.22	29.54	-23.32
25.680	25.03	QP	20.67	40.00	5.70	29.54	-23.84

#### ANT2

Frequency	Measurement results dB $\mu$ V @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dB $\mu$ V/m @30m	Limits dB $\mu$ V/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
6.021	24.55	QP	21.84	40.00	6.39	29.54	-23.15
15.730	26.38	QP	21.35	40.00	7.73	29.54	-21.81
25.680	24.25	QP	20.67	40.00	4.92	29.54	-24.62

#### ANT3

Frequency	Measurement results dB $\mu$ V @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dB $\mu$ V/m @30m	Limits dB $\mu$ V/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
6.258	24.96	QP	21.84	40.00	6.80	29.54	-22.74
15.369	23.61	QP	21.35	40.00	4.96	29.54	-24.58
24.259	25.12	QP	20.67	40.00	5.79	29.54	-23.75

## ANT4

Frequency	Measurement results dB $\mu$ V @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dB $\mu$ V/m @30m	Limits dB $\mu$ V/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
6.021	24.11	QP	21.84	40.00	5.95	29.54	-23.59
15.730	25.36	QP	21.35	40.00	6.71	29.54	-22.83
25.680	24.65	QP	20.67	40.00	5.32	29.54	-24.22

## ANT5

Frequency	Measurement results dB $\mu$ V @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dB $\mu$ V/m @30m	Limits dB $\mu$ V/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
6.021	24.56	QP	21.84	40.00	6.40	29.54	-23.14
15.730	25.11	QP	21.35	40.00	6.46	29.54	-23.08
25.680	24.53	QP	20.67	40.00	5.20	29.54	-24.34

## ANT6

Frequency	Measurement results dB $\mu$ V @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dB $\mu$ V/m @30m	Limits dB $\mu$ V/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
6.021	25.30	QP	21.84	40.00	7.14	29.54	-22.40
15.730	24.52	QP	21.35	40.00	5.87	29.54	-23.67
25.680	25.83	QP	20.67	40.00	6.50	29.54	-23.04

**Test Frequency : 26MHz ~ 30MHz**

The measurements were more than 20 dB below the limit and not reported.

**Test Frequency : 30MHz ~ 18GHz**

## ANT1

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Low Channel 2402MHz									
269.33	34.54	QP	114	1.3	H	-13.35	21.19	46.00	-24.81
269.33	40.64	QP	52	1.8	V	-13.35	27.29	46.00	-18.71
4804.00	46.24	PK	303	1.1	V	-1.06	45.18	74.00	-28.82
4804.00	42.03	Ave	303	1.1	V	-1.06	40.97	54.00	-13.03
7206.00	44.85	PK	171	1.1	H	1.33	46.18	74.00	-27.82
7206.00	36.72	Ave	171	1.1	H	1.33	38.05	54.00	-15.95
2332.61	46.32	PK	133	1.9	V	-13.19	33.13	74.00	-40.87
2332.61	39.19	Ave	133	1.9	V	-13.19	26.00	54.00	-28.00
2388.54	43.28	PK	85	1.9	H	-13.14	30.14	74.00	-43.86
2388.54	36.80	Ave	85	1.9	H	-13.14	23.66	54.00	-30.34
2497.61	42.96	PK	248	1.7	V	-13.08	29.88	74.00	-44.12
2497.61	38.95	Ave	248	1.7	V	-13.08	25.87	54.00	-28.13



Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Middle Channel 2440MHz									
269.33	33.32	QP	33	1.5	H	-13.35	19.97	46.00	-26.03
269.33	39.63	QP	231	1.5	V	-13.35	26.28	46.00	-19.72
4880.00	43.46	PK	286	1.6	V	-0.62	42.84	74.00	-31.16
4880.00	41.70	Ave	286	1.6	V	-0.62	41.08	54.00	-12.92
7320.00	44.36	PK	280	1.8	H	2.21	46.57	74.00	-27.43
7320.00	36.90	Ave	280	1.8	H	2.21	39.11	54.00	-14.89
2323.56	45.38	PK	199	1.8	V	-13.19	32.19	74.00	-41.81
2323.56	38.54	Ave	199	1.8	V	-13.19	25.35	54.00	-28.65
2354.39	43.57	PK	247	1.6	H	-13.14	30.43	74.00	-43.57
2354.39	38.58	Ave	247	1.6	H	-13.14	25.44	54.00	-28.56
2490.80	42.39	PK	36	1.7	V	-13.08	29.31	74.00	-44.69
2490.80	38.20	Ave	36	1.7	V	-13.08	25.12	54.00	-28.88

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK High Channel 2480MHz									
269.33	32.89	QP	113	1.8	H	-13.35	19.54	46.00	-26.46
269.33	38.46	QP	260	1.7	V	-13.35	25.11	46.00	-20.89
4960.00	43.43	PK	157	1.3	V	-0.24	43.19	74.00	-30.81
4960.00	40.34	Ave	157	1.3	V	-0.24	40.10	54.00	-13.90
7440.00	43.61	PK	106	1.6	H	2.84	46.45	74.00	-27.55
7440.00	36.29	Ave	106	1.6	H	2.84	39.13	54.00	-14.87
2313.47	45.66	PK	4	1.7	V	-13.19	32.47	74.00	-41.53
2313.47	38.06	Ave	4	1.7	V	-13.19	24.87	54.00	-29.13
2351.54	44.00	PK	117	1.7	H	-13.14	30.86	74.00	-43.14
2351.54	38.27	Ave	117	1.7	H	-13.14	25.13	54.00	-28.87
2484.36	44.76	PK	274	1.9	V	-13.08	31.68	74.00	-42.32
2484.36	36.02	Ave	274	1.9	V	-13.08	22.94	54.00	-31.06

## ANT2

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Low Channel 2402MHz									
269.33	34.95	QP	289	1.2	H	-13.35	21.60	46.00	-24.40
269.33	41.43	QP	226	1.9	V	-13.35	28.08	46.00	-17.92
4804.00	46.51	PK	247	1.8	V	-1.06	45.45	74.00	-28.55
4804.00	42.59	Ave	247	1.8	V	-1.06	41.53	54.00	-12.47
7206.00	45.71	PK	343	1.9	H	1.33	47.04	74.00	-26.96
7206.00	36.13	Ave	343	1.9	H	1.33	37.46	54.00	-16.54
2329.77	45.45	PK	174	1.7	V	-13.19	32.26	74.00	-41.74
2329.77	37.53	Ave	174	1.7	V	-13.19	24.34	54.00	-29.66
2356.89	44.22	PK	25	1.3	H	-13.14	31.08	74.00	-42.92
2356.89	36.46	Ave	25	1.3	H	-13.14	23.32	54.00	-30.68
2493.93	43.49	PK	79	1.5	V	-13.08	30.41	74.00	-43.59
2493.93	36.63	Ave	79	1.5	V	-13.08	23.55	54.00	-30.45

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Middle Channel 2440MHz									
269.33	33.82	QP	190	1.9	H	-13.35	20.47	46.00	-25.53
269.33	41.41	QP	328	1.2	V	-13.35	28.06	46.00	-17.94
4880.00	43.46	PK	342	1.8	V	-0.62	42.84	74.00	-31.16
4880.00	42.76	Ave	342	1.8	V	-0.62	42.14	54.00	-11.86
7320.00	44.33	PK	148	1.7	H	2.21	46.54	74.00	-27.46
7320.00	37.23	Ave	148	1.7	H	2.21	39.44	54.00	-14.56
2318.85	46.53	PK	108	1.7	V	-13.19	33.34	74.00	-40.66
2318.85	37.43	Ave	108	1.7	V	-13.19	24.24	54.00	-29.76
2366.27	44.66	PK	177	1.8	H	-13.14	31.52	74.00	-42.48
2366.27	38.74	Ave	177	1.8	H	-13.14	25.60	54.00	-28.40
2495.73	44.35	PK	98	1.8	V	-13.08	31.27	74.00	-42.73
2495.73	37.87	Ave	98	1.8	V	-13.08	24.79	54.00	-29.21

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK High Channel 2480MHz									
269.33	32.91	QP	291	1.8	H	-13.35	19.56	46.00	-26.44
269.33	38.46	QP	289	1.7	V	-13.35	25.11	46.00	-20.89
4960.00	42.28	PK	268	1.3	V	-0.24	42.04	74.00	-31.96
4960.00	41.34	Ave	268	1.3	V	-0.24	41.10	54.00	-12.90
7440.00	43.95	PK	275	1.3	H	2.84	46.79	74.00	-27.21
7440.00	36.29	Ave	275	1.3	H	2.84	39.13	54.00	-14.87
2314.45	46.63	PK	103	1.5	V	-13.19	33.44	74.00	-40.56
2314.45	38.84	Ave	103	1.5	V	-13.19	25.65	54.00	-28.35
2360.08	42.32	PK	22	1.6	H	-13.14	29.18	74.00	-44.82
2360.08	38.63	Ave	22	1.6	H	-13.14	25.49	54.00	-28.51
2488.52	44.10	PK	225	1.7	V	-13.08	31.02	74.00	-42.98
2488.52	38.82	Ave	225	1.7	V	-13.08	25.74	54.00	-28.26

## ANT3

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Low Channel 2402MHz									
254.36	34.12	QP	329	1.6	H	-13.35	20.77	46.00	-25.23
254.36	40.18	QP	176	1.5	V	-13.35	26.83	46.00	-19.17
4804.00	45.30	PK	93	1.4	V	-1.06	44.24	74.00	-29.76
4804.00	42.18	Ave	93	1.4	V	-1.06	41.12	54.00	-12.88
7206.00	45.20	PK	290	1.4	H	1.33	46.53	74.00	-27.47
7206.00	36.79	Ave	290	1.4	H	1.33	38.12	54.00	-15.88
2326.01	46.28	PK	23	1.9	V	-13.19	33.09	74.00	-40.91
2326.01	38.18	Ave	23	1.9	V	-13.19	24.99	54.00	-29.01
2365.17	44.26	PK	149	1.5	H	-13.14	31.12	74.00	-42.88
2365.17	38.31	Ave	149	1.5	H	-13.14	25.17	54.00	-28.83
2487.68	44.76	PK	221	1.5	V	-13.08	31.68	74.00	-42.32
2487.68	38.64	Ave	221	1.5	V	-13.08	25.56	54.00	-28.44

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Middle Channel 2440MHz									
254.36	34.08	QP	347	1.2	H	-13.35	20.73	46.00	-25.27
254.36	39.34	QP	65	1.4	V	-13.35	25.99	46.00	-20.01
4880.00	43.46	PK	236	1.4	V	-0.62	42.84	74.00	-31.16
4880.00	42.21	Ave	236	1.4	V	-0.62	41.59	54.00	-12.41
7320.00	44.87	PK	309	1.8	H	2.21	47.08	74.00	-26.92
7320.00	36.33	Ave	309	1.8	H	2.21	38.54	54.00	-15.46
2327.77	45.40	PK	208	1.4	V	-13.19	32.21	74.00	-41.79
2327.77	37.47	Ave	208	1.4	V	-13.19	24.28	54.00	-29.72
2376.14	43.78	PK	275	1.9	H	-13.14	30.64	74.00	-43.36
2376.14	36.19	Ave	275	1.9	H	-13.14	23.05	54.00	-30.95
2499.18	42.39	PK	294	1.2	V	-13.08	29.31	74.00	-44.69
2499.18	36.68	Ave	294	1.2	V	-13.08	23.60	54.00	-30.40

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK High Channel 2480MHz									
254.36	34.53	QP	256	1.9	H	-13.35	21.18	46.00	-24.82
254.36	38.46	QP	225	1.2	V	-13.35	25.11	46.00	-20.89
4960.00	44.68	PK	311	1.9	V	-0.24	44.44	74.00	-29.56
4960.00	42.87	Ave	311	1.9	V	-0.24	42.63	54.00	-11.37
7440.00	44.22	PK	292	2.0	H	2.84	47.06	74.00	-26.94
7440.00	36.29	Ave	292	2.0	H	2.84	39.13	54.00	-14.87
2346.23	46.48	PK	248	1.7	V	-13.19	33.29	74.00	-40.71
2346.23	39.70	Ave	248	1.7	V	-13.19	26.51	54.00	-27.49
2355.13	42.76	PK	165	1.6	H	-13.14	29.62	74.00	-44.38
2355.13	37.29	Ave	165	1.6	H	-13.14	24.15	54.00	-29.85
2492.82	43.47	PK	207	1.1	V	-13.08	30.39	74.00	-43.61
2492.82	38.66	Ave	207	1.1	V	-13.08	25.58	54.00	-28.42



## ANT4

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Low Channel 2402MHz									
269.33	35.41	QP	164	1.0	H	-13.35	22.06	46.00	-23.94
269.33	40.55	QP	151	1.6	V	-13.35	27.20	46.00	-18.80
4804.00	45.65	PK	355	1.8	V	-1.06	44.59	74.00	-29.41
4804.00	41.76	Ave	355	1.8	V	-1.06	40.70	54.00	-13.30
7206.00	45.50	PK	60	2.0	H	1.33	46.83	74.00	-27.17
7206.00	36.02	Ave	60	2.0	H	1.33	37.35	54.00	-16.65
2319.83	46.27	PK	264	1.7	V	-13.19	33.08	74.00	-40.92
2319.83	37.07	Ave	264	1.7	V	-13.19	23.88	54.00	-30.12
2376.77	43.30	PK	145	1.6	H	-13.14	30.16	74.00	-43.84
2376.77	37.51	Ave	145	1.6	H	-13.14	24.37	54.00	-29.63
2485.53	44.70	PK	273	2.0	V	-13.08	31.62	74.00	-42.38
2485.53	38.45	Ave	273	2.0	V	-13.08	25.37	54.00	-28.63

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Middle Channel 2440MHz									
269.33	34.88	QP	32	1.7	H	-13.35	21.53	46.00	-24.47
269.33	39.46	QP	249	1.1	V	-13.35	26.11	46.00	-19.89
4880.00	43.46	PK	292	1.9	V	-0.62	42.84	74.00	-31.16
4880.00	43.08	Ave	292	1.9	V	-0.62	42.46	54.00	-11.54
7320.00	45.03	PK	49	1.5	H	2.21	47.24	74.00	-26.76
7320.00	36.01	Ave	49	1.5	H	2.21	38.22	54.00	-15.78
2346.34	45.75	PK	278	2.0	V	-13.19	32.56	74.00	-41.44
2346.34	39.88	Ave	278	2.0	V	-13.19	26.69	54.00	-27.31
2350.59	43.02	PK	144	1.5	H	-13.14	29.88	74.00	-44.12
2350.59	36.39	Ave	144	1.5	H	-13.14	23.25	54.00	-30.75
2485.91	42.55	PK	87	1.4	V	-13.08	29.47	74.00	-44.53
2485.91	37.10	Ave	87	1.4	V	-13.08	24.02	54.00	-29.98

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK High Channel 2480MHz									
269.33	33.43	QP	181	1.1	H	-13.35	20.08	46.00	-25.92
269.33	38.46	QP	240	1.7	V	-13.35	25.11	46.00	-20.89
4960.00	42.03	PK	97	1.1	V	-0.24	41.79	74.00	-32.21
4960.00	43.86	Ave	97	1.1	V	-0.24	43.62	54.00	-10.38
7440.00	46.21	PK	92	1.3	H	2.84	49.05	74.00	-24.95
7440.00	36.29	Ave	92	1.3	H	2.84	39.13	54.00	-14.87
2344.73	45.07	PK	93	1.9	V	-13.19	31.88	74.00	-42.12
2344.73	38.18	Ave	93	1.9	V	-13.19	24.99	54.00	-29.01
2358.68	42.12	PK	73	1.3	H	-13.14	28.98	74.00	-45.02
2358.68	36.52	Ave	73	1.3	H	-13.14	23.38	54.00	-30.62
2495.40	42.45	PK	59	1.7	V	-13.08	29.37	74.00	-44.63
2495.40	38.39	Ave	59	1.7	V	-13.08	25.31	54.00	-28.69

## ANT5

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Low Channel 2402MHz									
269.33	34.86	QP	140	1.2	H	-13.35	21.51	46.00	-24.49
269.33	41.06	QP	355	1.8	V	-13.35	27.71	46.00	-18.29
4804.00	45.12	PK	269	1.6	V	-1.06	44.06	74.00	-29.94
4804.00	41.56	Ave	269	1.6	V	-1.06	40.50	54.00	-13.50
7206.00	45.14	PK	16	1.4	H	1.33	46.47	74.00	-27.53
7206.00	36.49	Ave	16	1.4	H	1.33	37.82	54.00	-16.18
2342.69	45.66	PK	180	1.5	V	-13.19	32.47	74.00	-41.53
2342.69	39.56	Ave	180	1.5	V	-13.19	26.37	54.00	-27.63
2356.00	43.01	PK	335	1.9	H	-13.14	29.87	74.00	-44.13
2356.00	37.58	Ave	335	1.9	H	-13.14	24.44	54.00	-29.56
2497.37	44.23	PK	62	1.4	V	-13.08	31.15	74.00	-42.85
2497.37	36.97	Ave	62	1.4	V	-13.08	23.89	54.00	-30.11

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Middle Channel 2440MHz									
269.33	33.91	QP	241	1.0	H	-13.35	20.56	46.00	-25.44
269.33	41.33	QP	331	1.3	V	-13.35	27.98	46.00	-18.02
4880.00	43.46	PK	232	1.3	V	-0.62	42.84	74.00	-31.16
4880.00	40.79	Ave	232	1.3	V	-0.62	40.17	54.00	-13.83
7320.00	44.06	PK	272	1.0	H	2.21	46.27	74.00	-27.73
7320.00	36.36	Ave	272	1.0	H	2.21	38.57	54.00	-15.43
2318.33	46.02	PK	319	1.4	V	-13.19	32.83	74.00	-41.17
2318.33	39.32	Ave	319	1.4	V	-13.19	26.13	54.00	-27.87
2387.64	42.13	PK	277	1.5	H	-13.14	28.99	74.00	-45.01
2387.64	36.10	Ave	277	1.5	H	-13.14	22.96	54.00	-31.04
2487.10	43.05	PK	160	1.8	V	-13.08	29.97	74.00	-44.03
2487.10	36.66	Ave	160	1.8	V	-13.08	23.58	54.00	-30.42

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK High Channel 2480MHz									
269.33	33.05	QP	195	1.7	H	-13.35	19.70	46.00	-26.30
269.33	38.46	QP	235	1.9	V	-13.35	25.11	46.00	-20.89
4960.00	44.57	PK	242	1.1	V	-0.24	44.33	74.00	-29.67
4960.00	41.50	Ave	242	1.1	V	-0.24	41.26	54.00	-12.74
7440.00	45.23	PK	139	1.2	H	2.84	48.07	74.00	-25.93
7440.00	36.29	Ave	139	1.2	H	2.84	39.13	54.00	-14.87
2311.28	45.13	PK	127	1.2	V	-13.19	31.94	74.00	-42.06
2311.28	39.93	Ave	127	1.2	V	-13.19	26.74	54.00	-27.26
2389.69	42.52	PK	331	1.7	H	-13.14	29.38	74.00	-44.62
2389.69	36.12	Ave	331	1.7	H	-13.14	22.98	54.00	-31.02
2493.57	43.68	PK	287	1.9	V	-13.08	30.60	74.00	-43.40
2493.57	37.70	Ave	287	1.9	V	-13.08	24.62	54.00	-29.38

## ANT6

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Low Channel 2402MHz									
269.33	34.37	QP	149	1.8	H	-13.35	21.02	46.00	-24.98
269.33	41.01	QP	215	1.1	V	-13.35	27.66	46.00	-18.34
4804.00	44.20	PK	348	1.4	V	-1.06	43.14	74.00	-30.86
4804.00	40.70	Ave	348	1.4	V	-1.06	39.64	54.00	-14.36
7206.00	45.42	PK	290	1.0	H	1.33	46.75	74.00	-27.25
7206.00	35.72	Ave	290	1.0	H	1.33	37.05	54.00	-16.95
2337.54	46.70	PK	197	1.0	V	-13.19	33.51	74.00	-40.49
2337.54	38.65	Ave	197	1.0	V	-13.19	25.46	54.00	-28.54
2387.48	43.51	PK	100	1.1	H	-13.14	30.37	74.00	-43.63
2387.48	37.83	Ave	100	1.1	H	-13.14	24.69	54.00	-29.31
2496.41	43.33	PK	266	1.7	V	-13.08	30.25	74.00	-43.75
2496.41	36.19	Ave	266	1.7	V	-13.08	23.11	54.00	-30.89

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK Middle Channel 2440MHz									
269.33	35.83	QP	287	1.1	H	-13.35	22.48	46.00	-23.52
269.33	41.42	QP	333	1.9	V	-13.35	28.07	46.00	-17.93
4880.00	43.46	PK	64	1.6	V	-0.62	42.84	74.00	-31.16
4880.00	41.70	Ave	64	1.6	V	-0.62	41.08	54.00	-12.92
7320.00	44.15	PK	341	1.9	H	2.21	46.36	74.00	-27.64
7320.00	36.11	Ave	341	1.9	H	2.21	38.32	54.00	-15.68
2328.05	46.25	PK	121	1.3	V	-13.19	33.06	74.00	-40.94
2328.05	37.57	Ave	121	1.3	V	-13.19	24.38	54.00	-29.62
2383.40	42.67	PK	102	1.3	H	-13.14	29.53	74.00	-44.47
2383.40	37.38	Ave	102	1.3	H	-13.14	24.24	54.00	-29.76
2494.54	43.71	PK	47	1.7	V	-13.08	30.63	74.00	-43.37
2494.54	37.39	Ave	47	1.7	V	-13.08	24.31	54.00	-29.69



Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB $\mu$ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
GFSK High Channel 2480MHz									
269.33	34.61	QP	56	1.4	H	-13.35	21.26	46.00	-24.74
269.33	38.46	QP	218	1.7	V	-13.35	25.11	46.00	-20.89
4960.00	43.39	PK	74	1.9	V	-0.24	43.15	74.00	-30.85
4960.00	41.92	Ave	74	1.9	V	-0.24	41.68	54.00	-12.32
7440.00	44.59	PK	135	1.6	H	2.84	47.43	74.00	-26.57
7440.00	36.29	Ave	135	1.6	H	2.84	39.13	54.00	-14.87
2330.04	45.81	PK	328	1.1	V	-13.19	32.62	74.00	-41.38
2330.04	38.19	Ave	328	1.1	V	-13.19	25.00	54.00	-29.00
2375.12	42.47	PK	145	1.0	H	-13.14	29.33	74.00	-44.67
2375.12	36.02	Ave	145	1.0	H	-13.14	22.88	54.00	-31.12
2499.84	44.21	PK	162	1.3	V	-13.08	31.13	74.00	-42.87
2499.84	37.11	Ave	162	1.3	V	-13.08	24.03	54.00	-29.97

**Test Frequency: 18GHz~25GHz**

The measurements were more than 20 dB below the limit and not reported.

## 8 Conducted Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019;  
ANSI C63.10:2013

Test Result: PASS

Limit:

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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

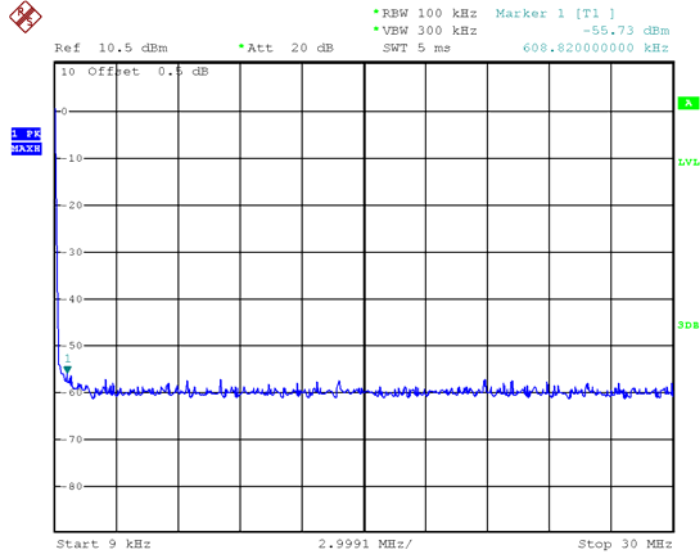
### 8.1 Test Procedure

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:
  - a) Set instrument center frequency to DTS channel center frequency.
  - b) Set the span to  $\approx 1.5$  times the DTS bandwidth.
  - c) Set the RBW = 100 kHz.
  - d) Set the VBW  $\approx [3 \times \text{RBW}]$ .
  - e) Detector = peak.
  - f) Sweep time = auto couple.
  - g) Trace mode = max hold.
  - h) Allow trace to fully stabilize.
  - i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

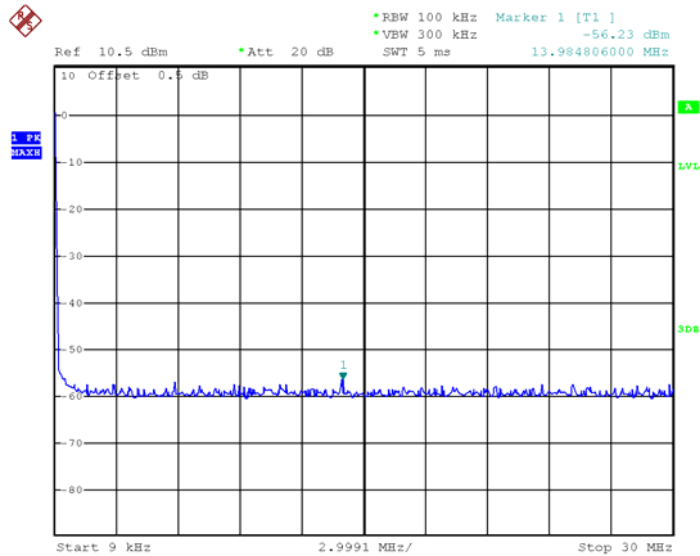
## 8.2 Test Result

### BLE Low Channel

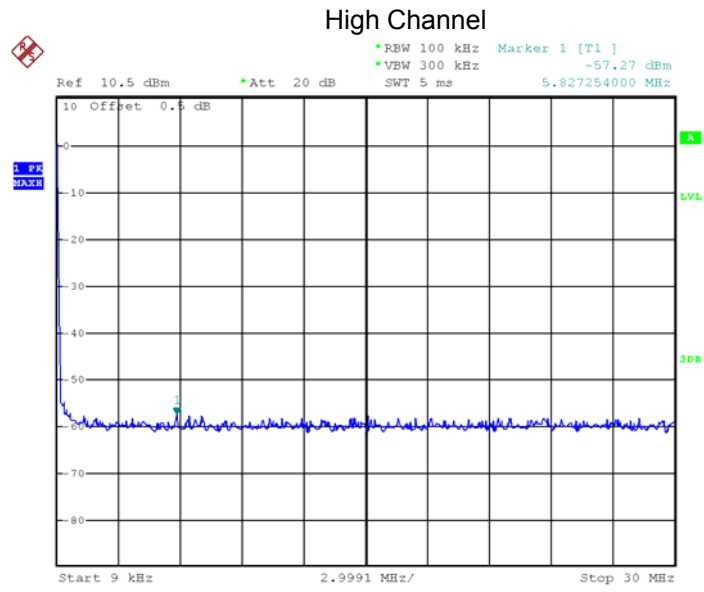


Date: 26.AUG.2018 20:12:03

### Middle Channel



Date: 26.AUG.2018 20:11:18



Date: 26.AUG.2018 20:11:48

BLE  
Low Channel

Fundamental



Middle Channel

Fundamental



### High Channel

Fundamental



## 9 Band Edge Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019;  
ANSI C63.10:2013

Test Limit: Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band 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)).

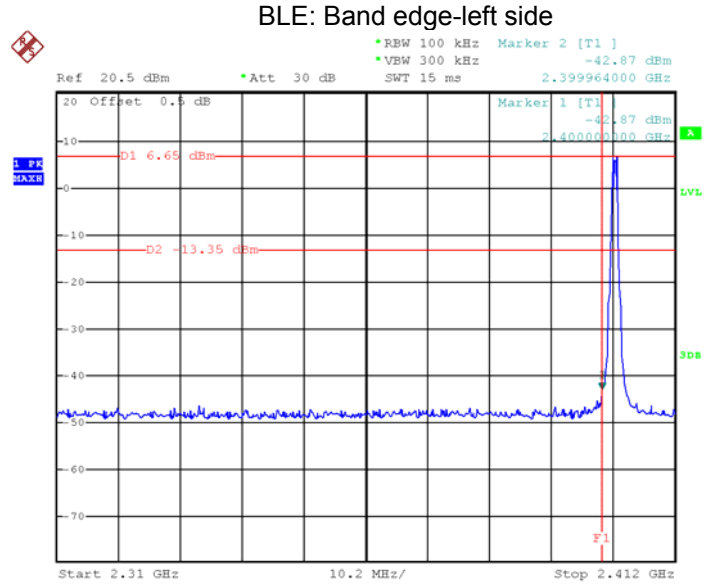
Test Mode: Transmitting

### 9.1 Test Produce

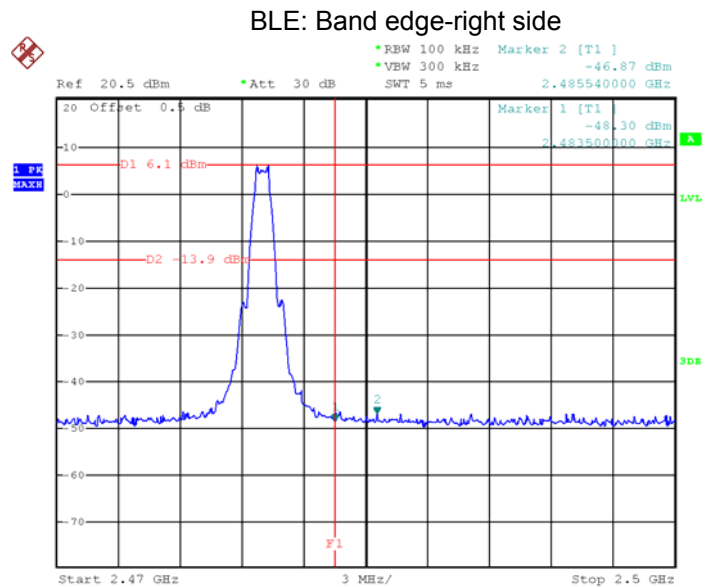
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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 Result

Test result plots shown as follows:



Date: 22.DEC.2019 20:07:32



Date: 22.DEC.2019 20:18:57



## 10 6 dB Bandwidth and 99% Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019;

ANSI C63.10:2013

### 10.1 Test Procedure:

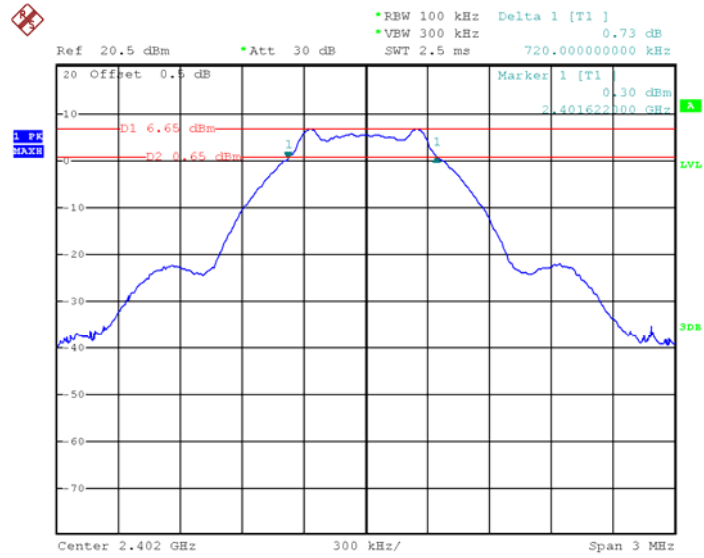
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

### 10.2 Test Result:

Operation mode	Test Channel	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
BLE	Channel 0	0.720	1.080
	Channel 19	0.714	1.074
	Channel 39	0.714	1.080

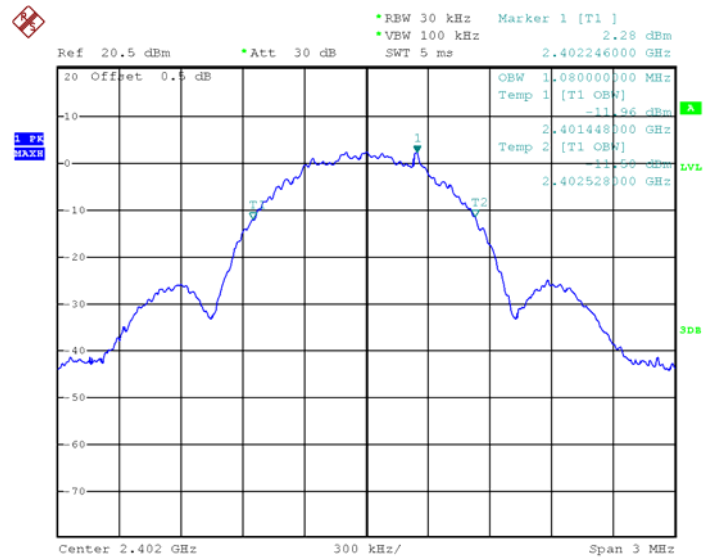
Test result plot:

BLE: channel 0  
6dB Bandwidth



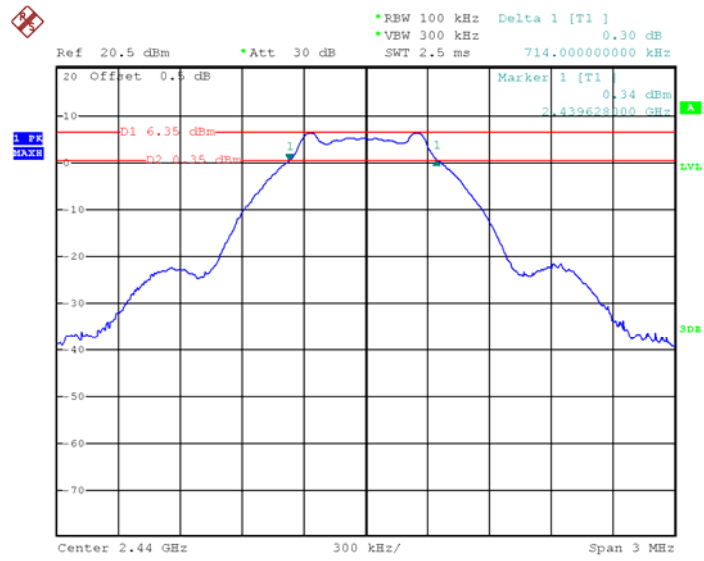
Date: 22.DEC.2019 20:05:06

99% Bandwidth



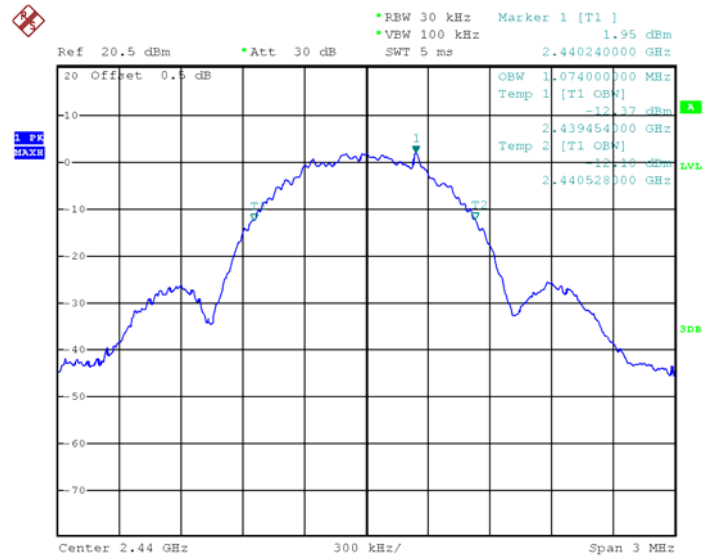
Date: 22.DEC.2019 20:03:14

### BLE: channel 19 6 dB Bandwidth



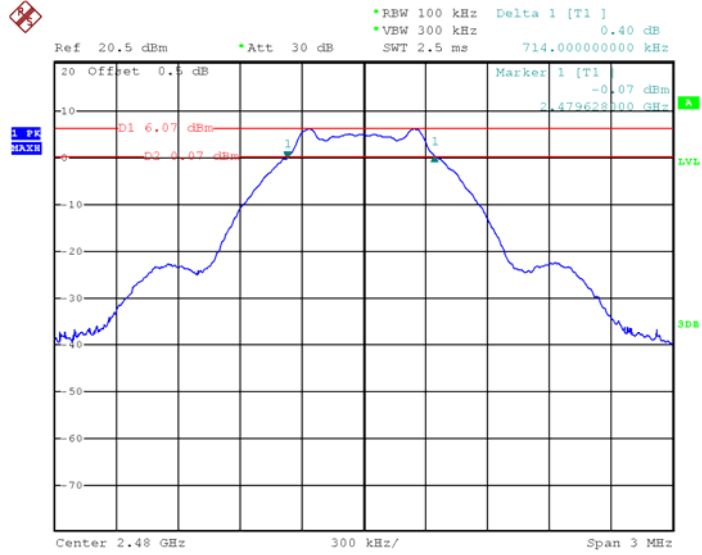
Date: 22.DEC.2019 20:12:41

### 99% Bandwidth



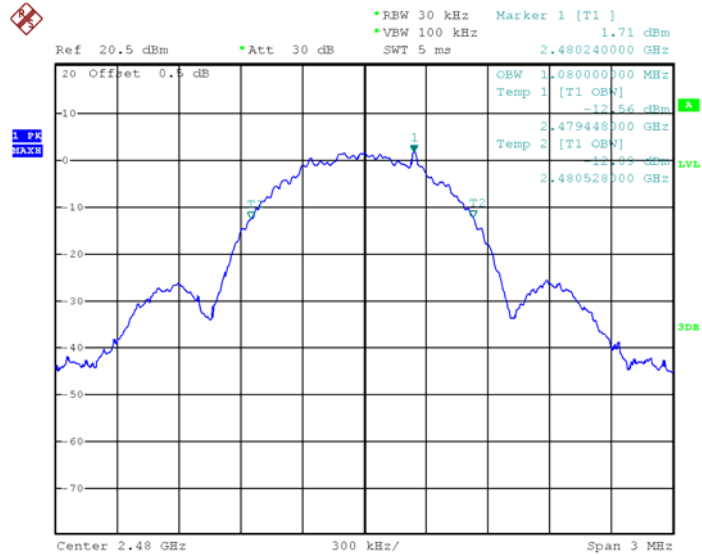
Date: 22.DEC.2019 20:11:33

BLE: channel 39  
6 dB Bandwidth



Date: 22.DEC.2019 20:15:12

99% Bandwidth



Date: 22.DEC.2019 20:16:35

## 11 Maximum Peak conducted Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019;  
ANSI C63.10:2013

### 11.1 Test Procedure:

KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019

section 8.3.1.1 (For BLE)

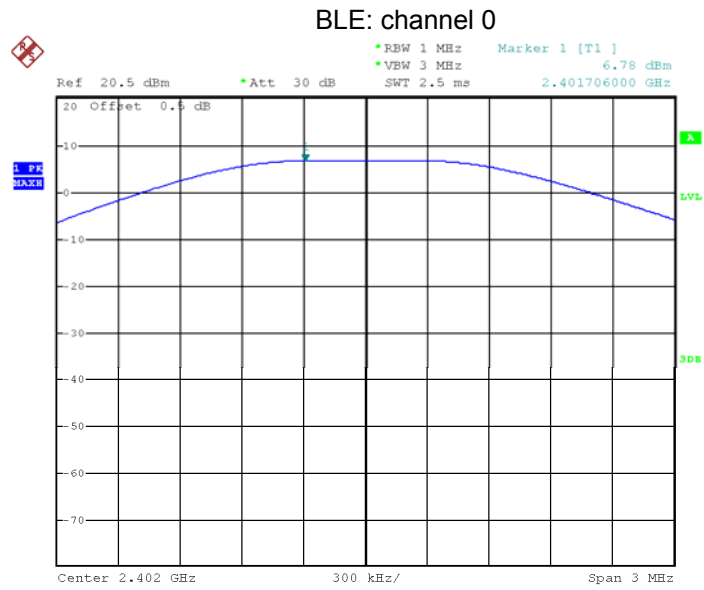
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- a) Set the RBW  $\geq$  DTS bandwidth.
- b) Set VBW  $\geq 3 \times$  RBW.
- c) Set span  $\geq 3 \times$  RBW
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

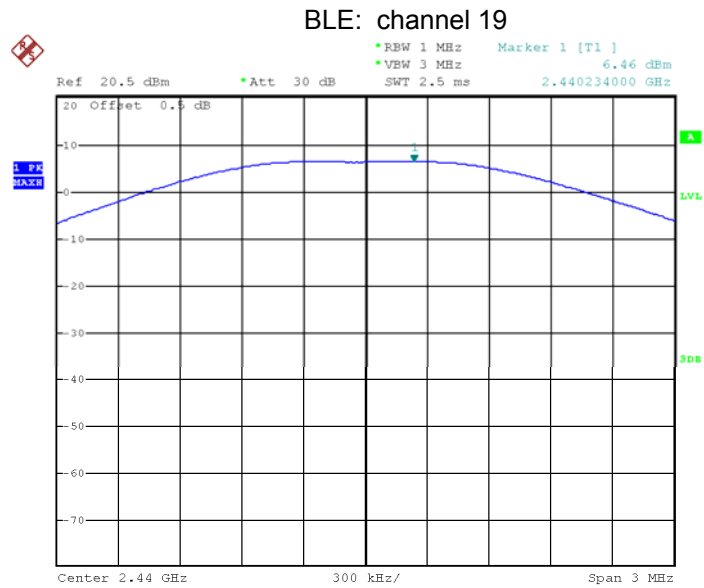
**11.2 Test Result:**

<b>Operation mode</b>	<b>Channel Frequency (MHz)</b>	<b>Maximum Peak Output Power (dBm)</b>	<b>Limit</b>
BLE	Low-2402	6.78	1W/30dBm
	Middle-2440	6.46	1W/30dBm
	High-2480	6.21	1W/30dBm

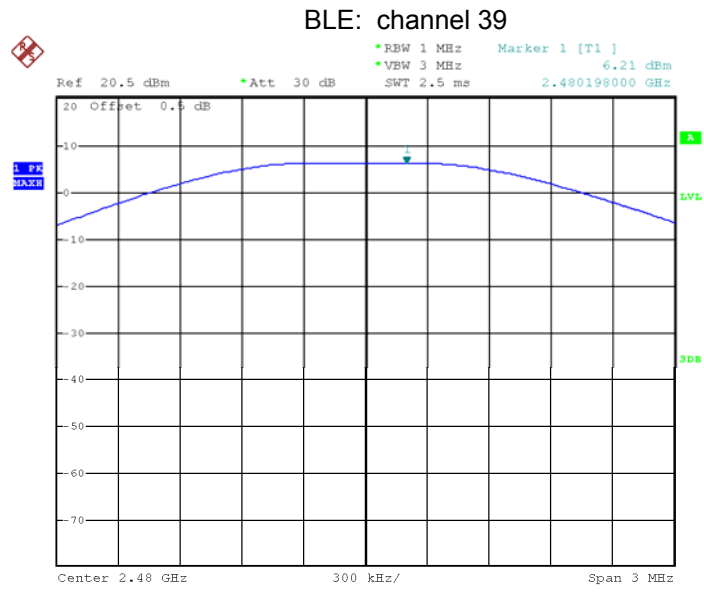
### Test Plot



Date: 22.DEC.2019 19:54:10



Date: 22.DEC.2019 20:10:40



Date: 22.DEC.2019 20:17:43



## 12 Duty cycle

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	ANSI C63.10: 2013
Test Limit:	N/A
Test Result:	PASS
Remark:	EUT transmitting continuously

## 13 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019;  
ANSI C63.10:2013

### 13.1 Test Procedure:

KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019 section 10.2

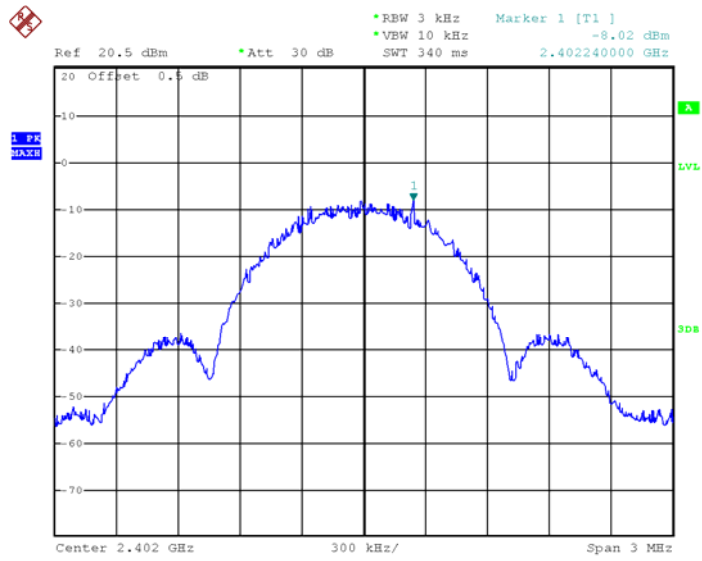
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to 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.

### 13.2 Test Result:

Operation mode	Channel Frequency (MHz)	Power Spectral (dBm per 3kHz)	Limit
BLE	Low-2402	-8.02	8dBm per 3kHz
	Middle-2440	-8.25	8dBm per 3kHz
	High-2480	-8.48	8dBm per 3kHz

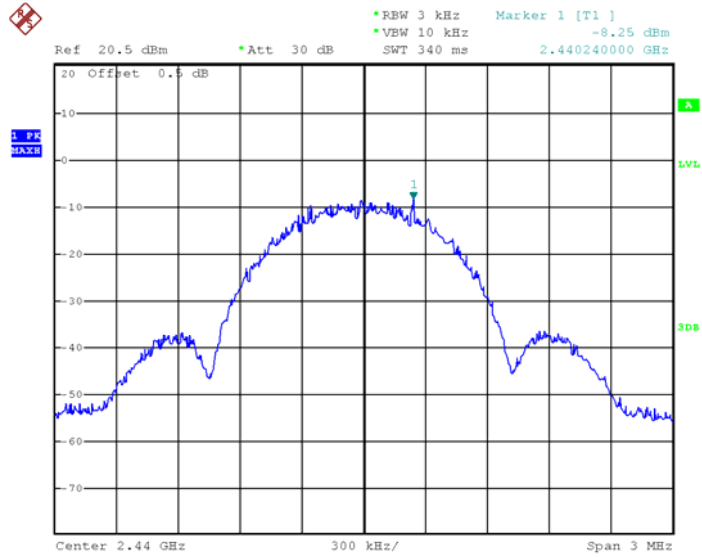
### Test Plot

BLE: channel 0

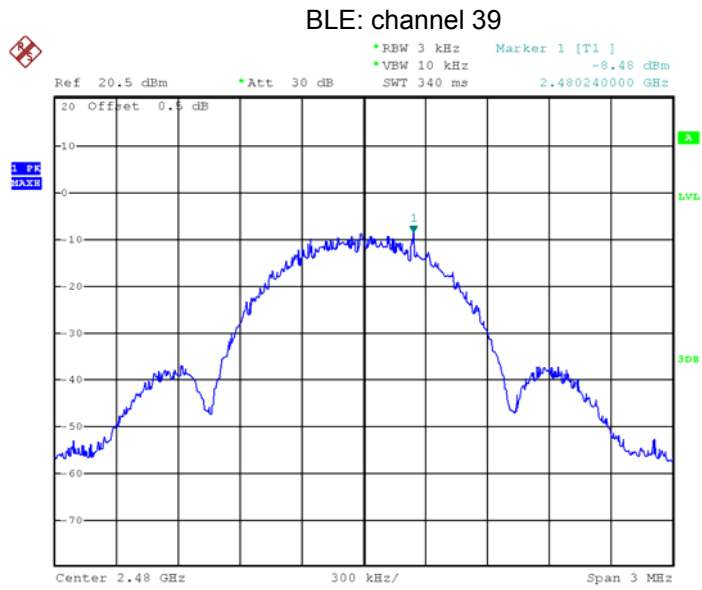


Date: 22.DEC.2019 20:05:59

BLE: channel 19



Date: 22.DEC.2019 20:10:09



Date: 22.DEC.2019 20:17:05

## 14 Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product has an integrated antenna fulfill the requirement of this section.

## 15 RF Exposure

Remark: refer to MPE test report: WTS19S11080405W002.

## **16 Photographs of test setup and EUT.**

Note: Please refer to appendix- panlink3-Photo.

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