Product Service

FCC - TEST REPORT

Report Number	:	**708881503688-00**	Date of Issue:	April 16, 2016

Model	:	U4
Product Type	:	BCT Bluetooth Headset
Applicant	:	Suzhou YOKO BCT Electronic Corporation
Address	:	P-48, No.666 Jianlin Road, High tech Zone, Suzhou Jiangsu, People's Republic of China
Production Facility	:	Suzhou YOKO BCT Electronic Corporation
Address	:	P-48, No.666 Jianlin Road, High tech Zone, Suzhou Jiangsu, People's Republic of China

Test Result	:	■ **Positive** ☐ **Negative**
Total pages including Appendices	:	76

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2 Details about the Test Laboratory

Details about the Test Laboratory
Test Site 1

Company name:	MRT Technology (Suzhou) Co., Ltd
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
FCC Registration Number:	809388
Telephone:	+86-512-66308358
Fax:	+86-512-66308368

Test Site 2

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch No.16 Lane, 1951 Du Hui Road, Shanghai 201108, P.R. China
FCC Registration Number:	904822
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3 Description of the Equipment Under Test

Product:	BCT Bluetooth Headset
Model no.:	U4
FCC ID:	2AG8AYKU4A
Options and accessories:	
Rating:	5V, 150mA DC battery
RF Transmission Frequency:	2402~2480MHz
No. of Operated Channel:	79
Modulation:	GFSK, π/4DQPSK,8DPSK
Duty Cycle:	less than 100%
Antenna Type:	PCB
Antenna Gain:	0dBi
Description of the EUT:	Bluetooth Headset

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2014 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to Public Notice DA 00-705 -Frequency Hopper Spread Spectrum Test Procedure released by FCC on March 30, 2000 and C63.10 (2013).

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5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C,				
Test Condition		Pages	Test Site	Test Result
§15.207	Conducted emission AC power port	12	Site 1	Pass
§15.247(b)(1)	Conducted peak output power	15	Site 1	Pass
§15.247(a)(2)	6dB bandwidth	---	---	N/A
§15.247(a)(1)	20dB bandwidth and 99% Occupied Bandwidth	22	Site 1	Pass
§15.247(a)(1)	Carrier frequency separation	29	Site 1	Pass
§15.247(a)(1)(iii)	Number of hopping frequencies	36	Site 1	Pass
§15.247(a)(1)(iii)	Dwell Time	40	Site 1	Pass
§15.247(e)	Power spectral density*	---	---	N/A
§15.247(d)	Spurious RF conducted emissions	45	Site 1	Pass
§15.247(d)	Band edge	48	Site 1	Pass
§15.247(d) & §15.209 &	Spurious radiated emissions for transmitter and receiver	68	Site 1	Pass
§15.203	Antenna requirement	See note 1		Pass

Remark 1: N/A=Not Applicable.
Note 2: The EUT uses a permanently PCB Antenna, which gain is 0dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AG8AYKU4A complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules .

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: November 18, 2015

Testing Start Date: December 19, 2015

Testing End Date: January 28, 2016

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Reviewed by:

Hui TONG
Review Engineer

Prepared by:

Wenwen CHEN
Project Engineer

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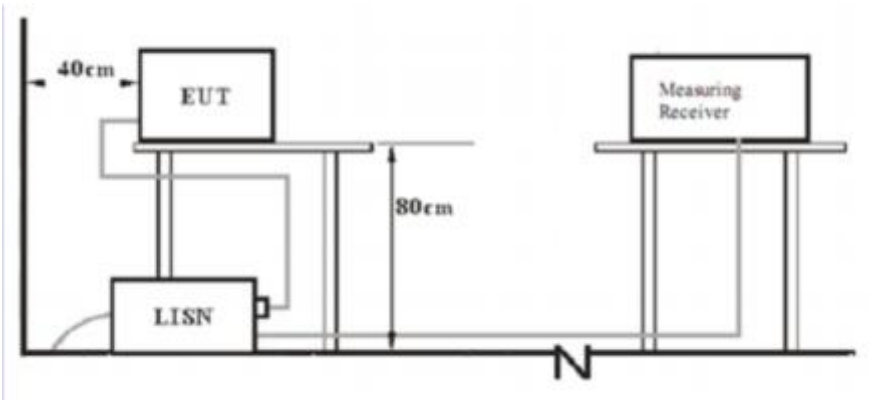
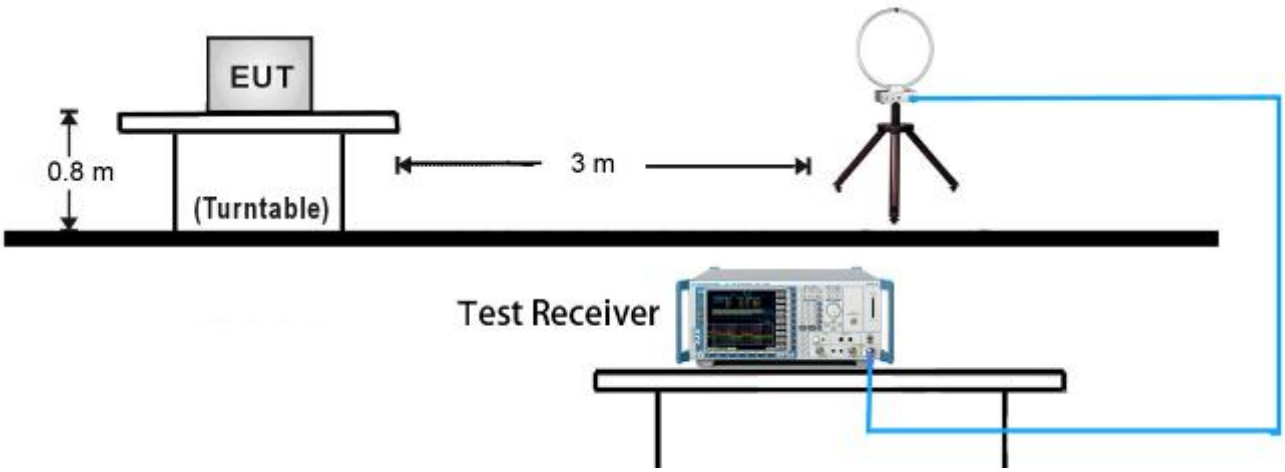
7 Test Setups

7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups

9kHz ~ 30MHz Test Setup:



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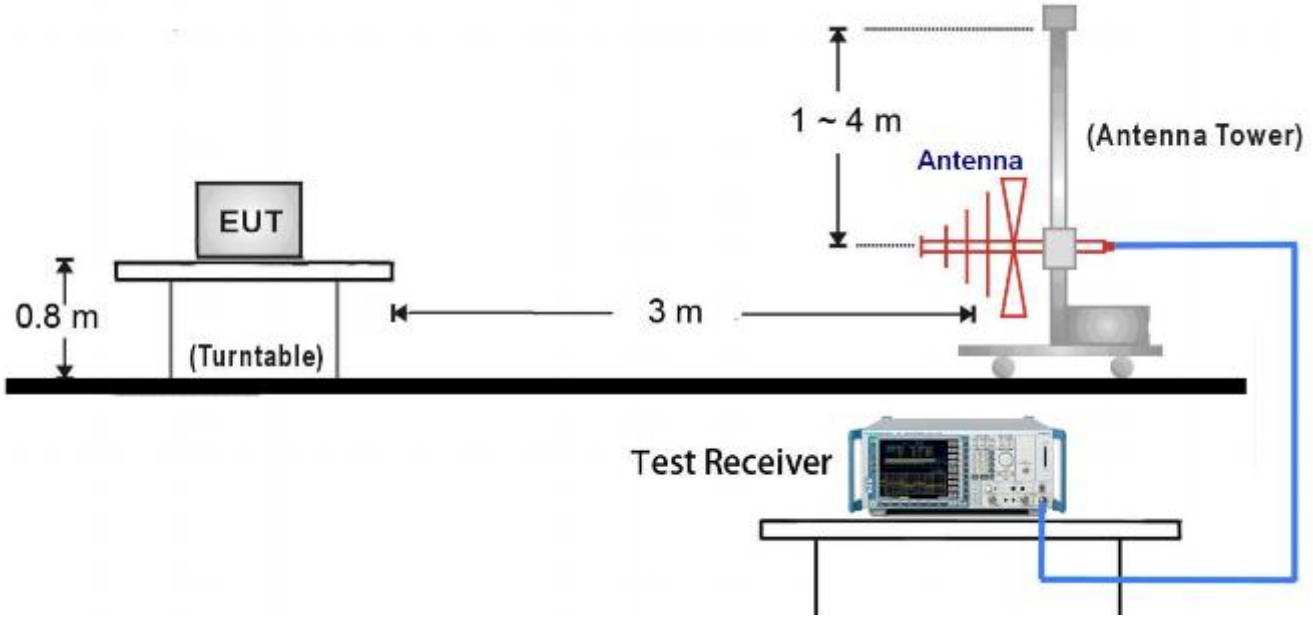
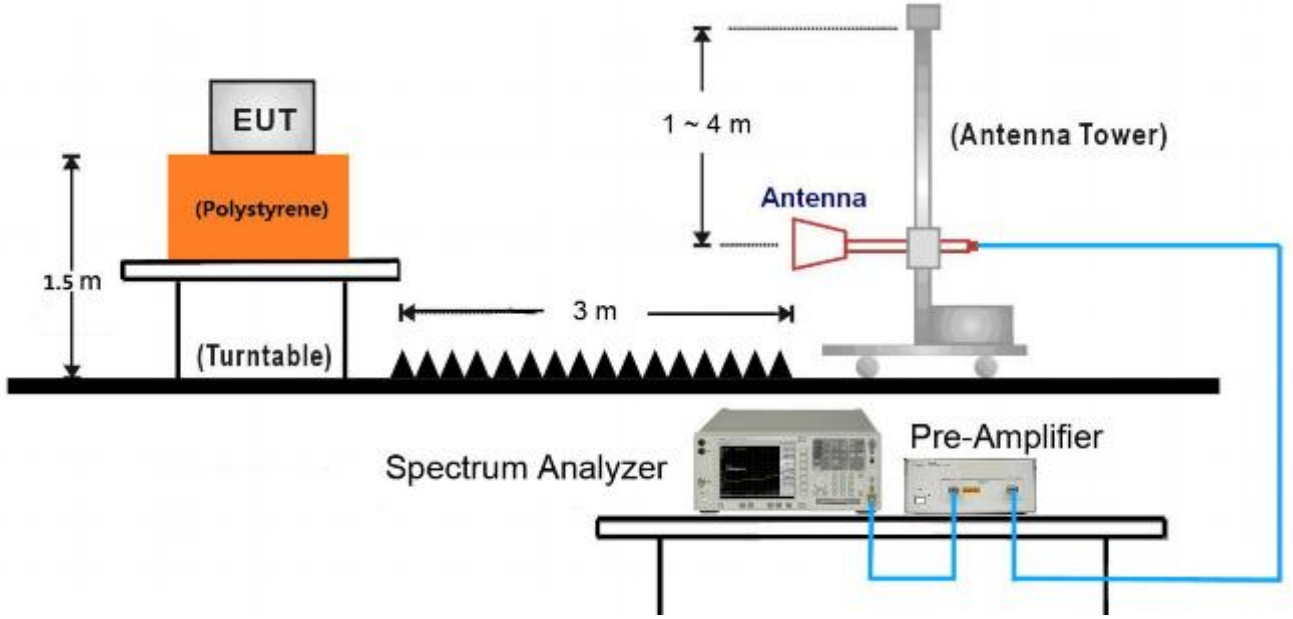
30MHz ~ 1GHz Test Setup:



1GHz ~ 18GHz Test Setup:



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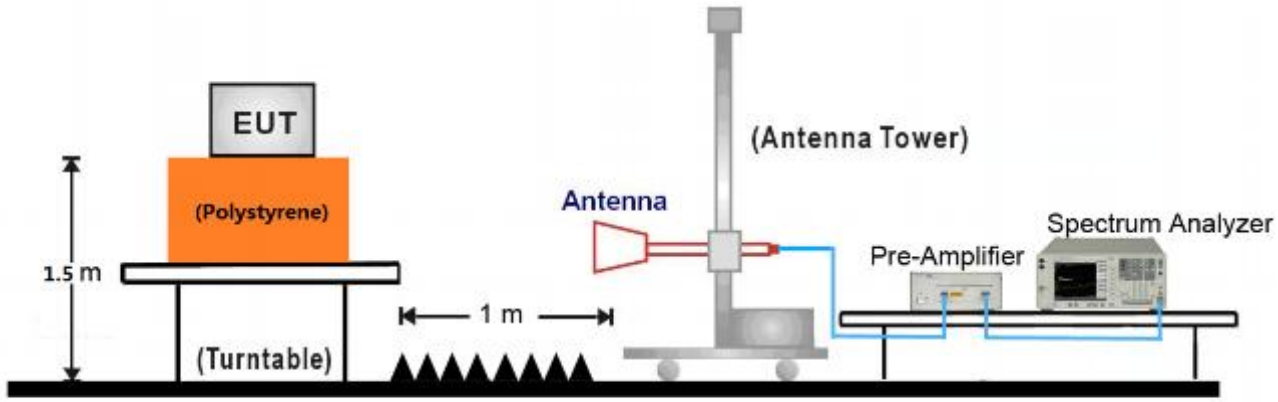
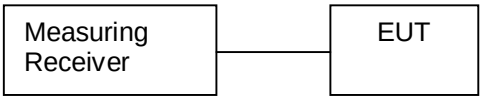
18GHz ~25GHz Test Setup:



7.3 Conducted RF test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Laptop	Lenovo	X230	---

Test software: BlueTest 3, which used to control the EUT in continues transmitting mode

The system was configured to hopping mode and non-hopping mode.

Hopping mode: typical working mode (normal hopping status)

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power

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9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

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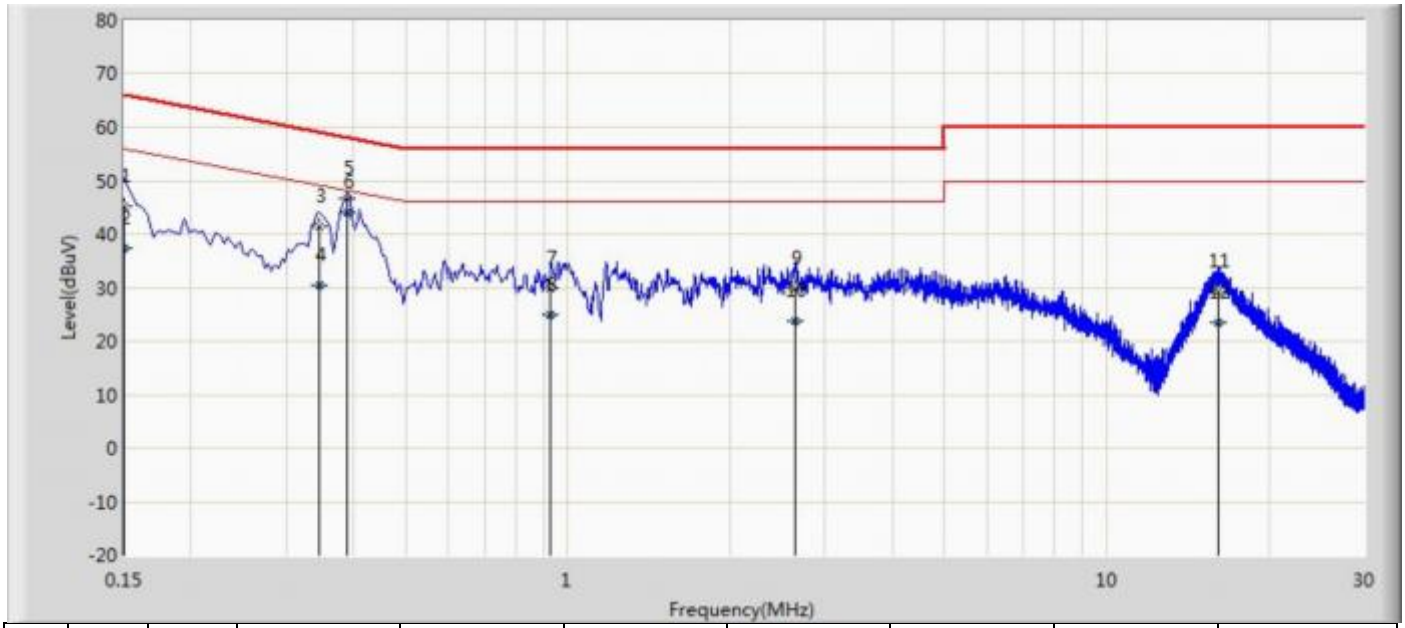
Product Service

Product Type :BCT Bluetooth Headset
M/N :U4
Operating Condition : Transmit on
Test Specification : FCC_Part15.207_CE_AC Power
Comment : AC 120V/60Hz, Line



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.150	45.118	33.949	-20.882	66.000	11.168	QP
2			0.150	37.402	26.234	-18.598	56.000	11.168	AV
3			0.346	41.401	31.359	-17.657	59.058	10.041	QP
4			0.346	30.302	20.261	-18.756	49.058	10.041	AV
5			0.390	46.698	36.621	-11.366	58.064	10.077	QP
6		*	0.390	44.142	34.065	-3.921	48.064	10.077	AV
7			0.930	29.824	19.880	-26.176	56.000	9.944	QP
8			0.930	25.071	15.126	-20.929	46.000	9.944	AV
9			2.638	29.722	19.869	-26.278	56.000	9.852	QP
10			2.638	23.760	13.908	-22.240	46.000	9.852	AV
11			16.086	29.308	19.235	-30.692	60.000	10.073	QP
12			16.086	23.414	13.341	-26.586	50.000	10.073	AV

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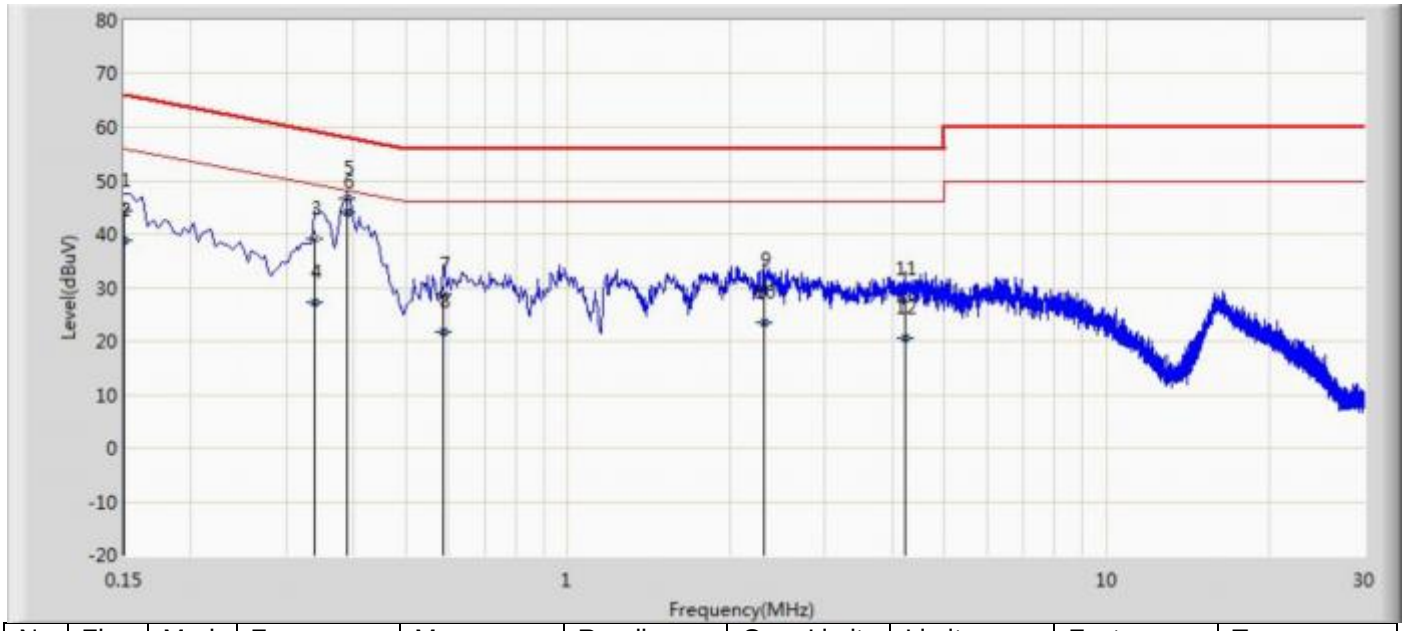
Product Service

Product Type :BCT Bluetooth Headset
M/N :U4
Operating Condition : Transmit on
Test Specification : FCC_Part15.207_CE_AC Power
Comment : AC 120V/60Hz, Neutral



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.150	44.426	33.284	-21.574	66.000	11.142	QP
2			0.150	38.785	27.643	-17.215	56.000	11.142	AV
3			0.338	39.161	29.095	-20.091	59.252	10.066	QP
4			0.338	27.276	17.211	-21.976	49.252	10.066	AV
5			0.390	46.525	36.420	-11.539	58.064	10.105	QP
6		*	0.390	43.986	33.881	-4.078	48.064	10.105	AV
7			0.586	28.613	18.474	-27.387	56.000	10.139	QP
8			0.586	21.830	11.691	-24.170	46.000	10.139	AV
9			2.314	29.661	19.795	-26.339	56.000	9.866	QP
10			2.314	23.357	13.491	-22.643	46.000	9.866	AV
11			4.214	27.949	17.964	-28.051	56.000	9.985	QP
12			4.214	20.537	10.552	-25.463	46.000	9.985	AV

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9.2 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
   Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
   RBW > the 20 dB bandwidth of the emission being measured, VBW≥RBW,
   Sweep = auto, Detector function = peak, Trace = max hold
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power

Limits

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30

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Conducted peak output power

1DH5

Frequency	Conducted Peak Output Power	Result
MHz	**dBm**	
Low channel 2402MHz	2.094	Pass
Middle channel 2441MHz	7.264	Pass
High channel 2480MHz	7.898	Pass

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2DH5

Frequency	Conducted Peak Output Power	Result
MHz	**dBm**	
Low channel 2402MHz	3.414	Pass
Middle channel 2441MHz	6.140	Pass
High channel 2480MHz	6.902	Pass

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3DH5

Frequency	Conducted Peak Output Power	Result
MHz	**dBm**	
Low channel 2402MHz	3.694	Pass
Middle channel 2441MHz	6.37	Pass
High channel 2480MHz	7.108	Pass

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9.3 20 dB bandwidth and 99% Occupied Bandwidth

Test Method

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 it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Limit

Limit [kHz]
N/A

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20 dB bandwidth and 99% Occupied Bandwidth

1DH5

Frequency MHz	20dB bandwidth kHz	**99% Bandwidth kHz**	Result
Top channel 2402MHz	923.7	854.69	Pass
Middle channel 2441MHz	925	860.66	Pass
Bottom channel 2480MHz	924.5	862.33	Pass

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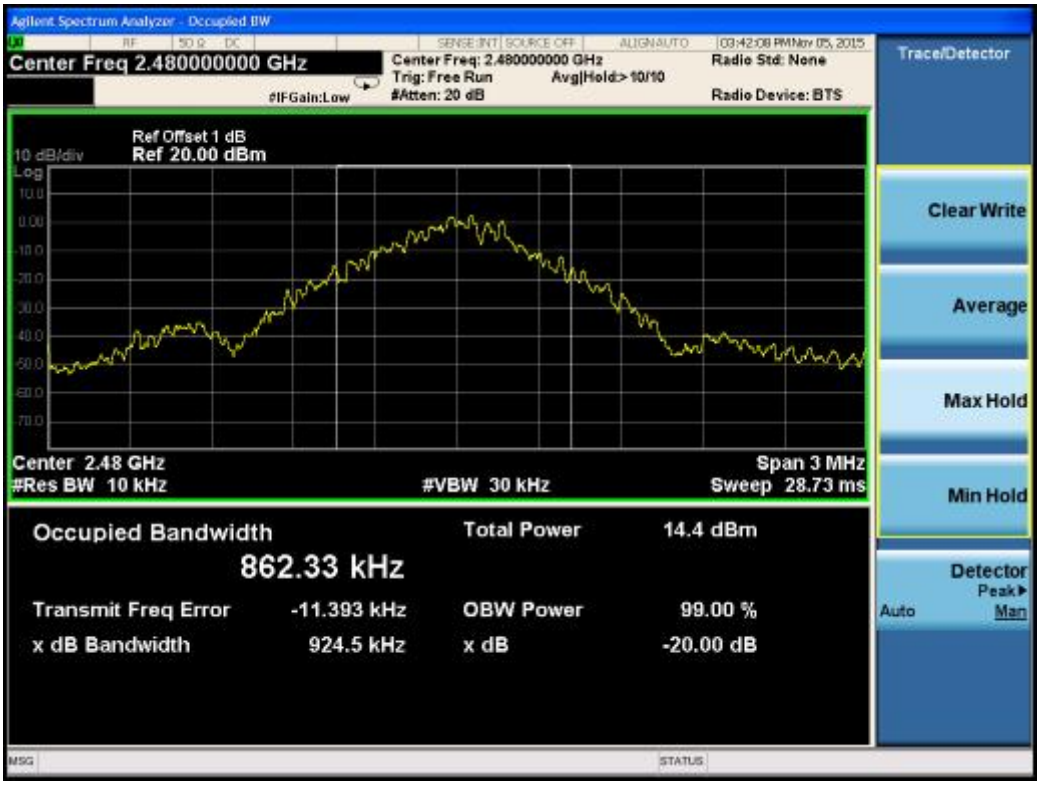

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20 dB bandwidth and 99% Occupied Bandwidth

2DH5

Frequency MHz	20dB bandwidth kHz	**99% Bandwidth kHz**	Result
Top channel 2402MHz	1233	1177.5	Pass
Middle channel 2441MHz	1235	1170.1	Pass
Bottom channel 2480MHz	1235	1171.8	Pass

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20 dB bandwidth and 99% Occupied Bandwidth

3DH5

Frequency MHz	20dB bandwidth kHz	**99% Bandwidth kHz**	Result
Top channel 2402MHz	1256	1164.9	Pass
Middle channel 2441MHz	1257	1169.4	Pass
Bottom channel 2480MHz	1259	1172.9	Pass

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9.4 Carrier Frequency Separation

Test Method

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥RBW, Sweep = auto, Detector function = peak
2. By using the Max-Hold function record the separation of two adjacent channels.
3. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function.
4. Repeat above procedures until all frequencies measured were complete.

Limit

Limit kHz
≥25KHz or 2/3 of the 20 dB bandwidth which is greater

1DH5

Frequency MHz	2/3 of 20 dB Bandwidth kHz
2402	615.8
2441	616.6667
2480	616.3333

2DH5

Frequency MHz	2/3 of 20 dB Bandwidth kHz
2402	822
2441	823.3333
2480	823.3333

3DH5

Frequency MHz	2/3 of 20 dB Bandwidth kHz
2402	837.3333
2441	838
2480	839.3333

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Carrier Frequency Separation

Test result: The measurement was performed with the typical configuration (normal hopping status), here GFSK modulation mode was used to show compliance.

1DH5 test result

Frequency MHz	Carrier Frequency Separation kHz	Result
2402	1000	Pass
2441	1000	Pass
2480	1000	Pass

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2DH5 test result

Frequency MHz	Carrier Frequency Separation kHz	Result
2402	1000	Pass
2441	1000	Pass
2480	1000	Pass

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3DH5 test result

Frequency MHz	Carrier Frequency Separation kHz	Result
2402	1000	Pass
2441	1000	Pass
2480	1000	Pass

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9.5 Number of hopping frequencies

Test Method

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥RBW, Sweep = auto, Detector function = peak
2. Set the spectrum analyzer on Max-Hold Mode, and then keep the EUT in hopping mode.
3. Record all the signals from each channel until each one has been recorded.
4. Repeat above procedures until all frequencies measured were complete.

Limit

Limit number
≥ 15

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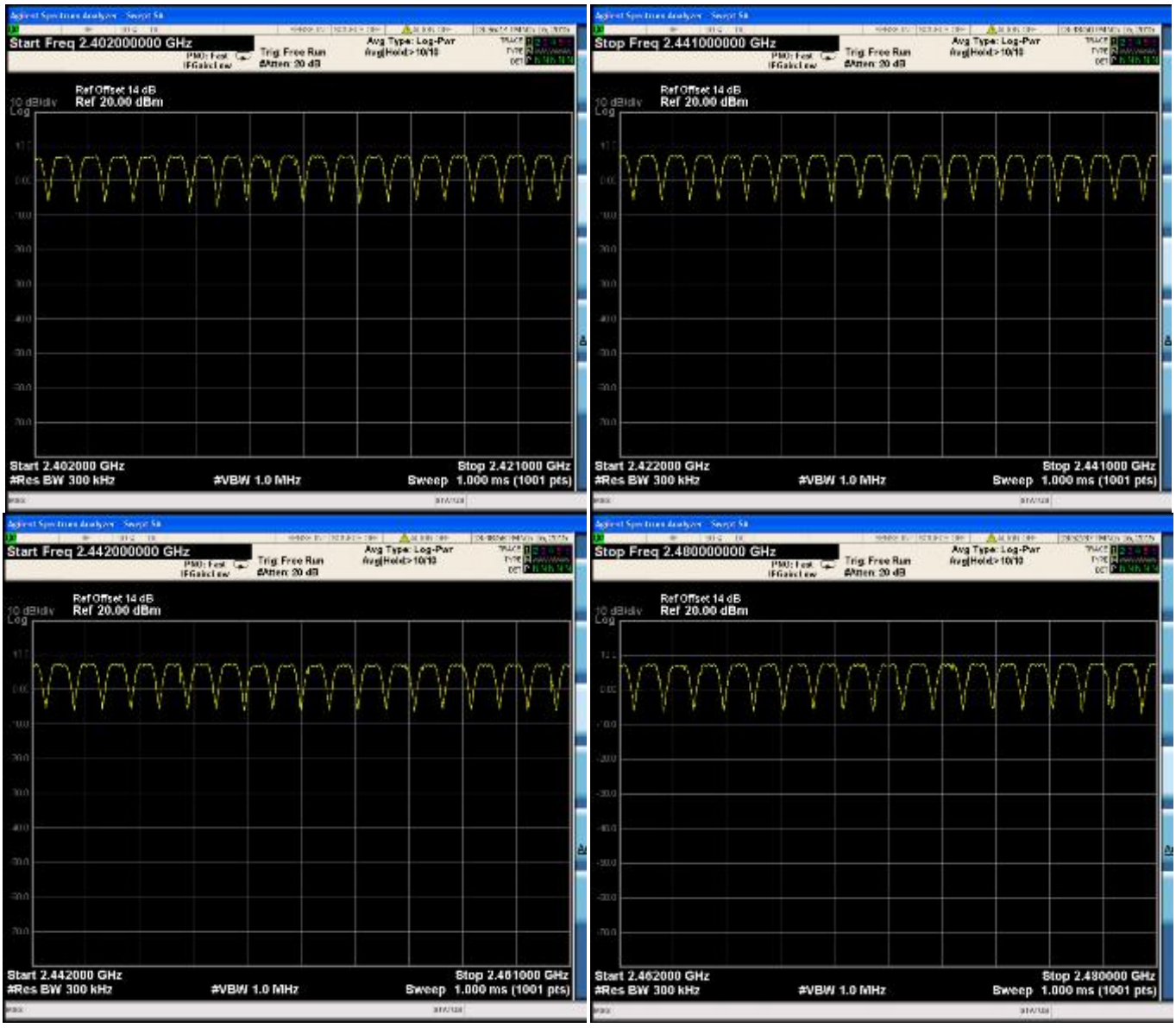
Number of hopping frequencies

Test result: The measurement was performed with the typical configuration (normal hopping status), and the total hopping channels is constant for the all modulation mode according with the Bluetooth Core Specification. Here GFSK modulation mode was used to show compliance.

Number of hopping frequencies	Result
79	Pass

1DH5 test result



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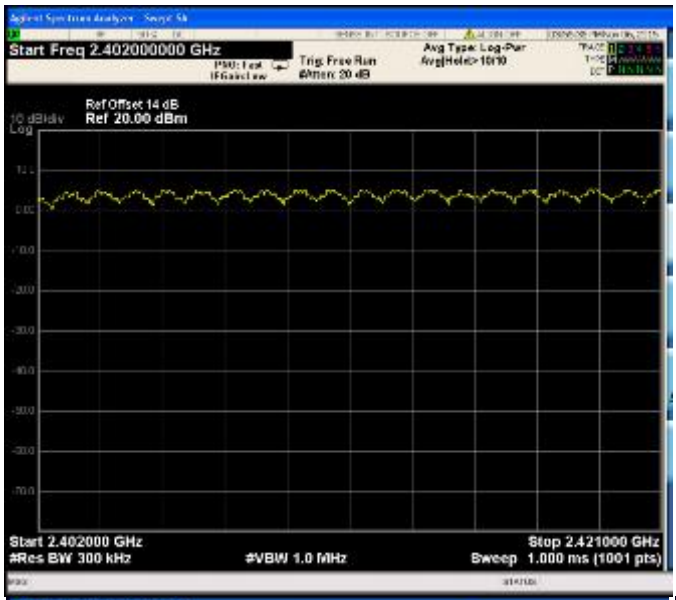
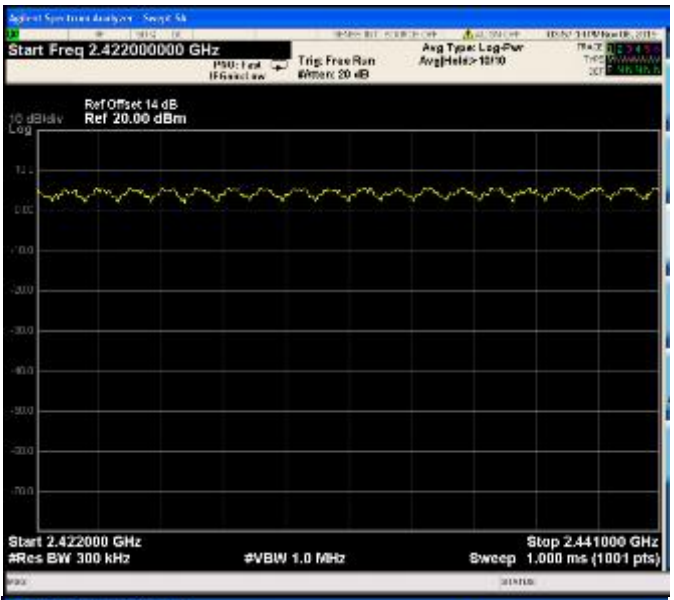
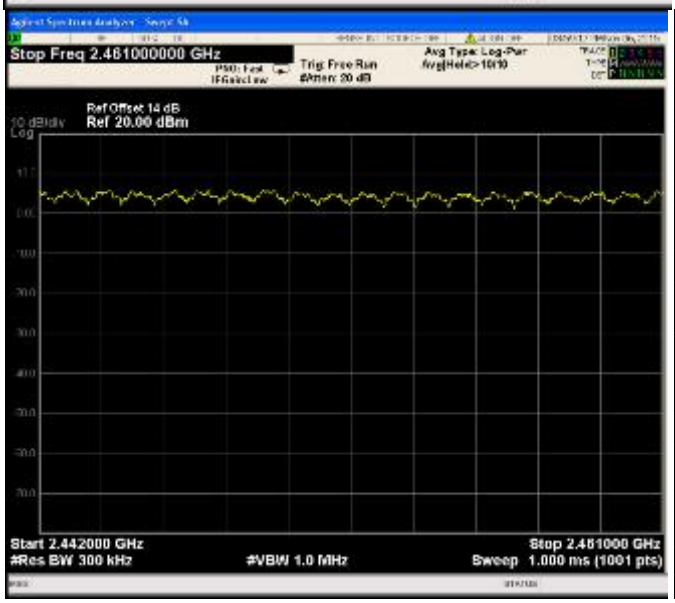
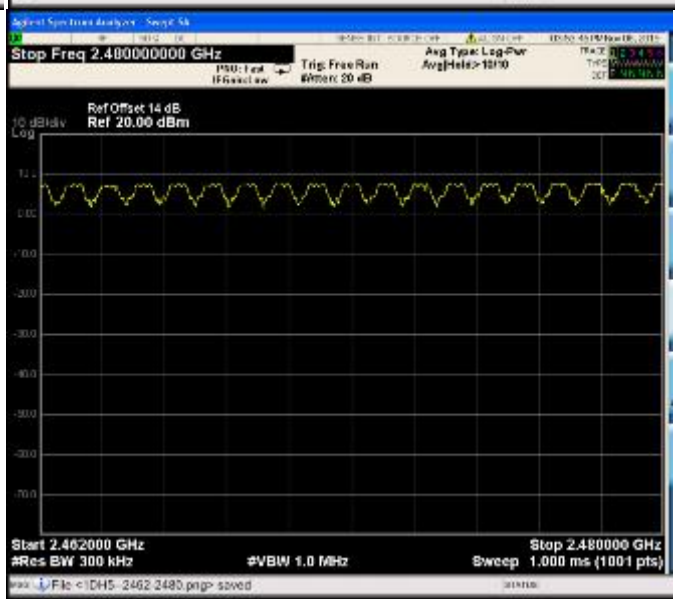
2DH5 test result









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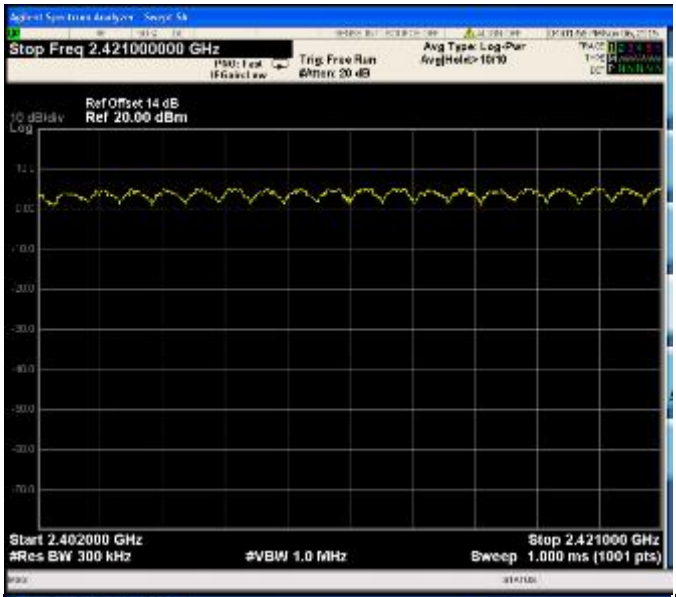
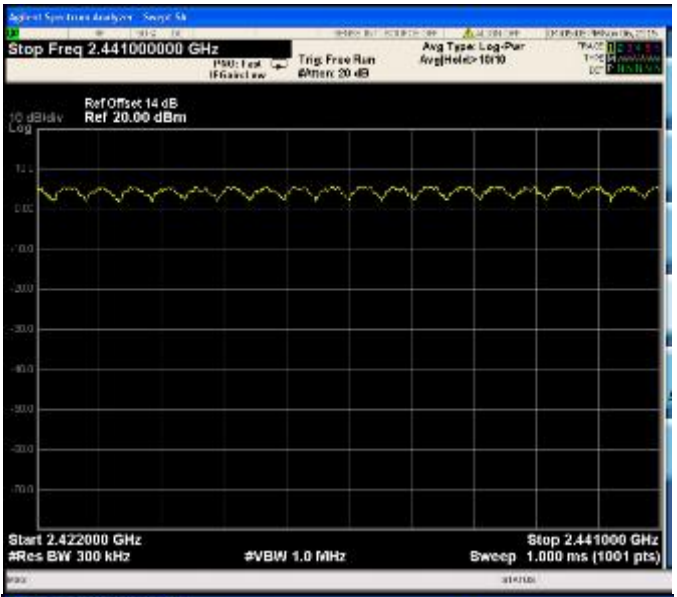
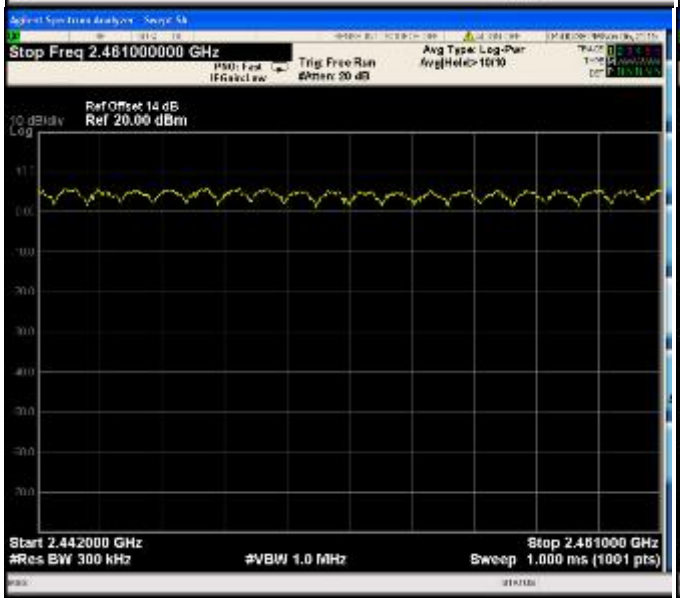
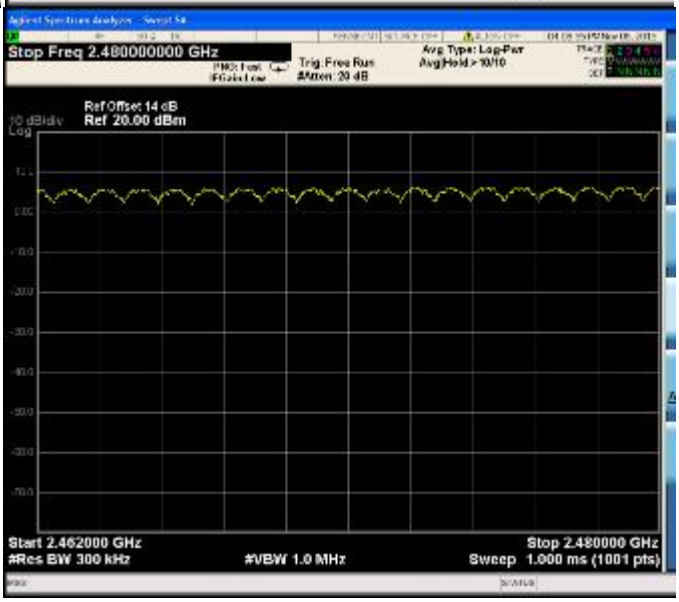
3DH5 test result









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9.6 Dwell Time

Test Method

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable. Equipment mode: Spectrum analyzer
2. RBW: 1MHz; VBW: 1MHz; SPAN: Zero Span
3. Adjust the center frequency of spectrum analyzer on any frequency be measured.
4. Measure the Dwell Time by spectrum analyzer Marker function.
5. Repeat above procedures until all frequencies measured were complete.

Limit

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

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Dwell Time

Dwell time

The maximum dwell time shall be 0,4 s.
According to the Bluetooth Core Specification, the worse result (DH5 mode) was reported to show compliance.

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows:
The duration for dwell time calculation: 0.4 [s] * hopping number = 0.4 [s] * 79 [ch] = 31.6 [s*ch];

The burst width, which is directly measured, refers to the duration on one channel hop.

The maximum number of hopping channels in 31.6s for DH5=1600 / 6 / 79 *31.6=106.67

Test Result

Modulation	Mode	Reading (µs)	Total Hops	Test Result (ms)	Limit (ms)	Result
GFSK	DH5	390.0	106.67	41.6013	< 400	Pass
π/4-DQPSK	2DH5	1640	106.67	174.939	< 400	Pass
8-DPSK	3DH5	2890	106.67	308.276	< 400	Pass

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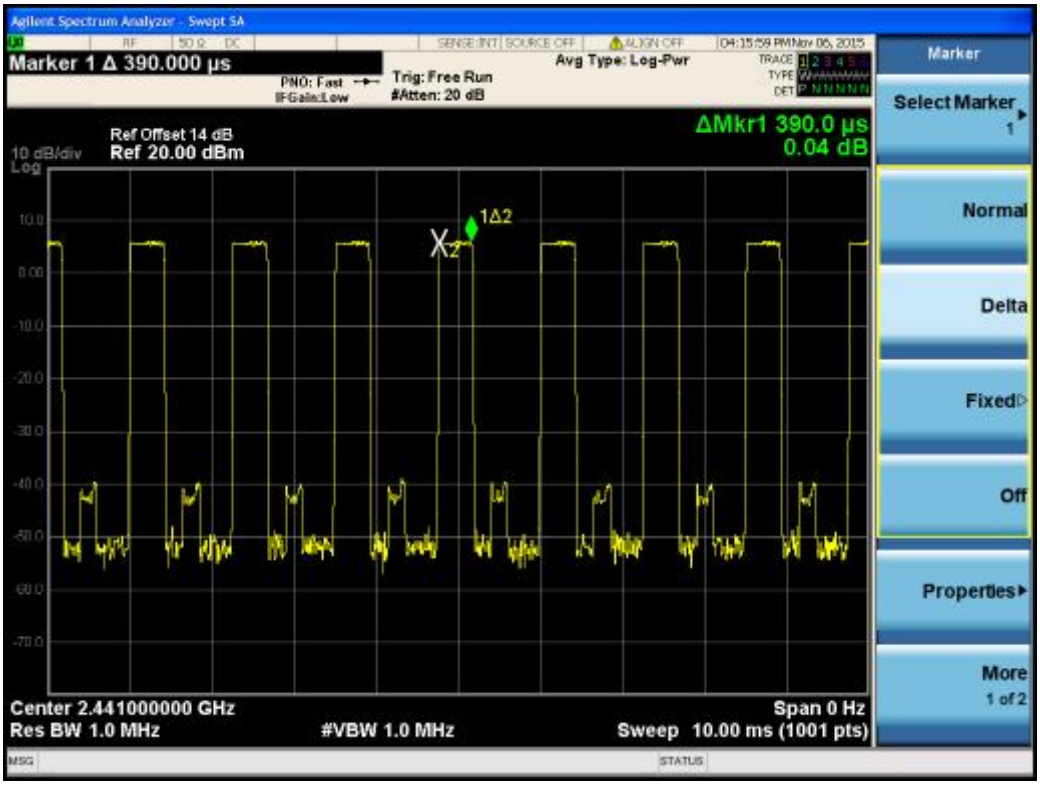
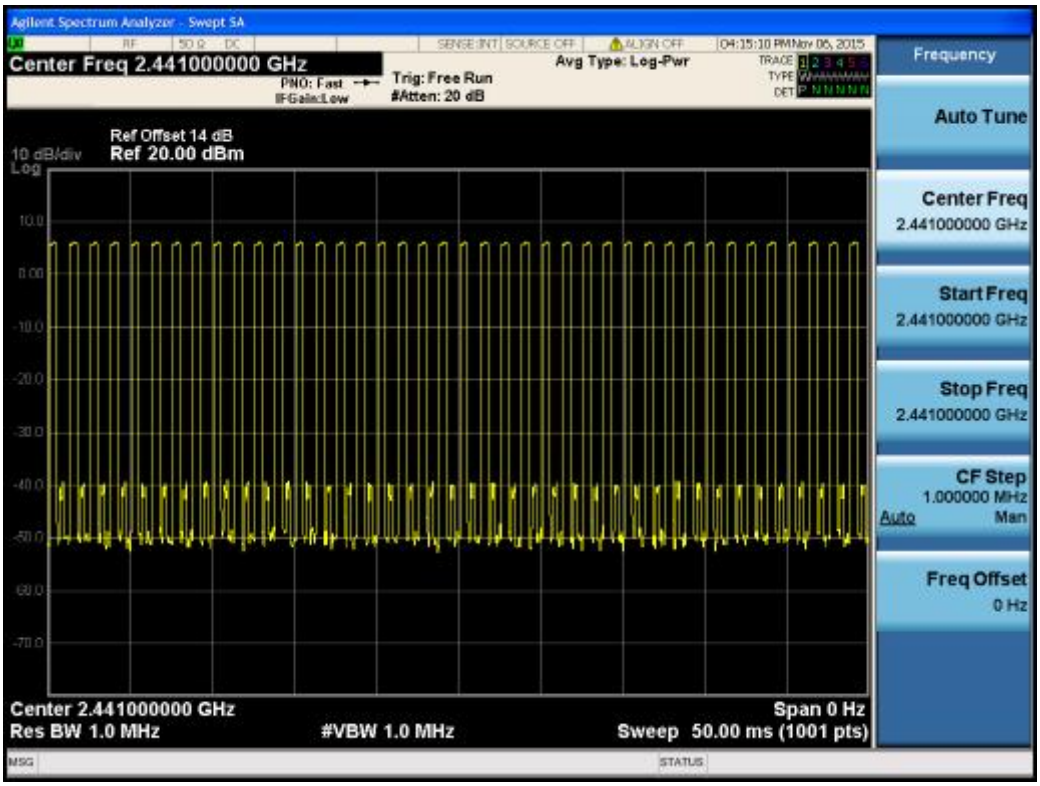
Product Service

3DH1





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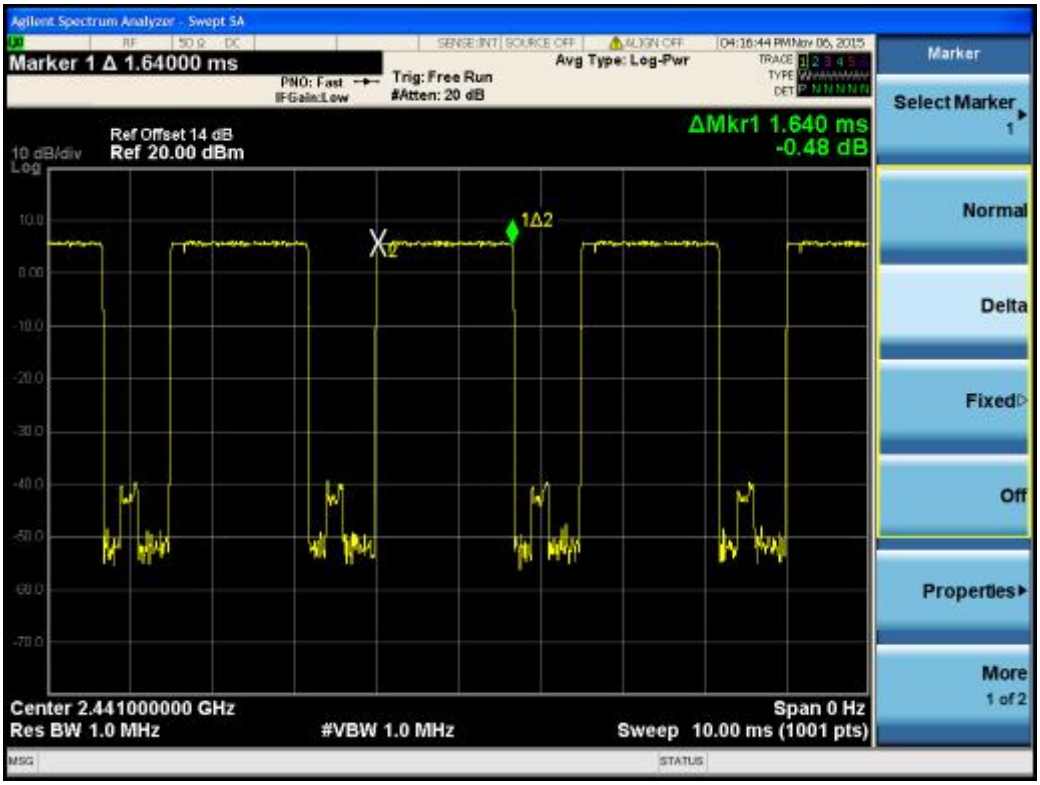
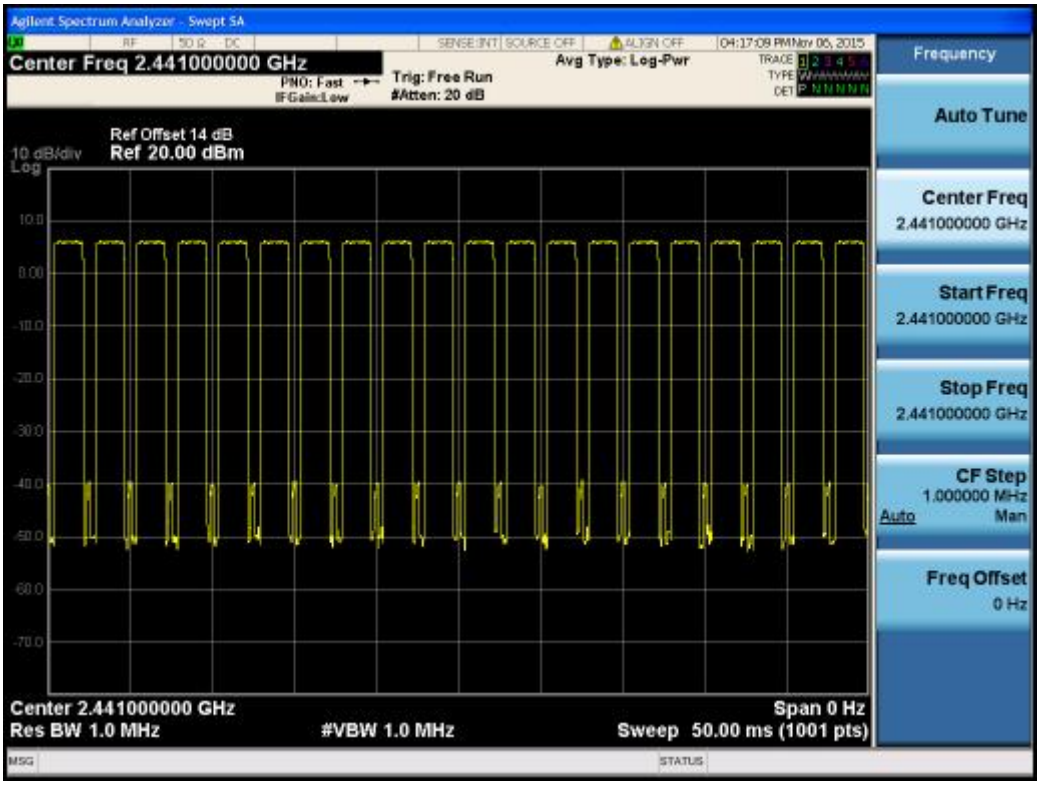
3DH3





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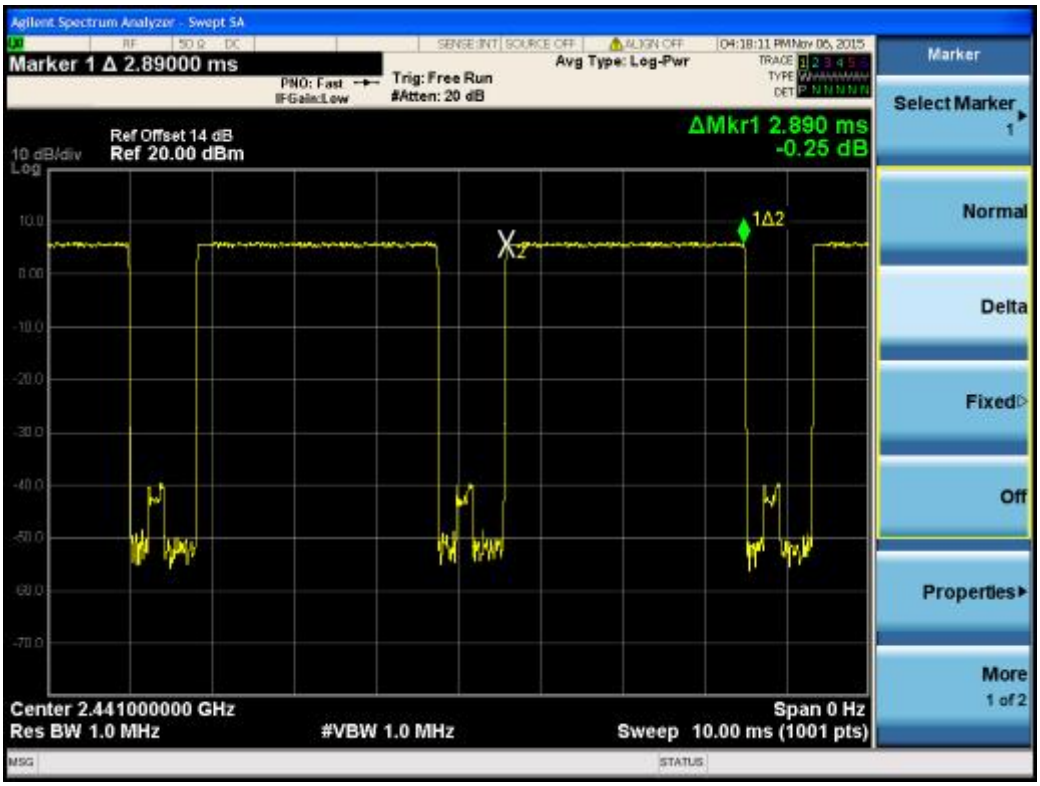
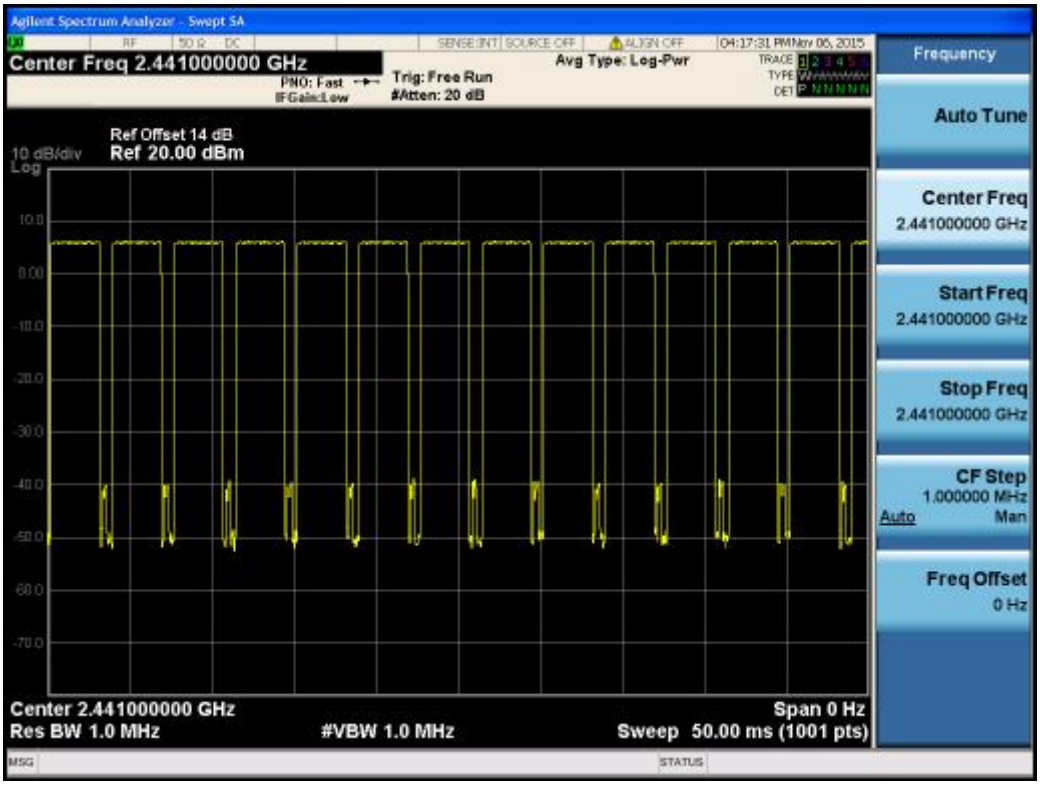
Product Service

3DH5





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9.7 Spurious RF conducted emissions

Test Method

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
   RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
3. The level displayed must comply with the limit specified in this Section. Submit these plots.
4. Repeat above procedures until all frequencies measured were complete.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

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Spurious RF conducted emissions

Only the worse case (which is subject to the maximum EIRP, 1DH5 mode) test result is listed in the report.

2402MHz

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2441MHz

2480MHz

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9.8 Band edge testing

Test Method

1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section. .
4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

Limit:

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) and RSS-Gen8.10, must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)) and RSS-Gen.

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Product Service

Band edge testing

1DH5

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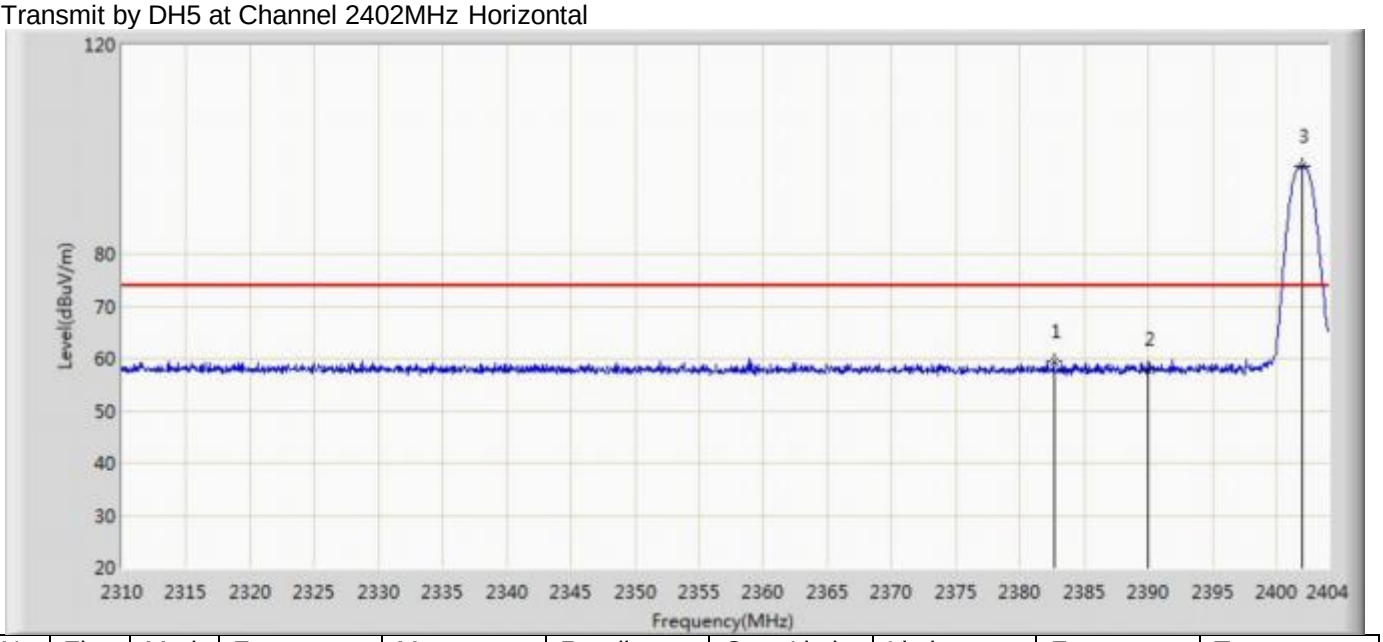
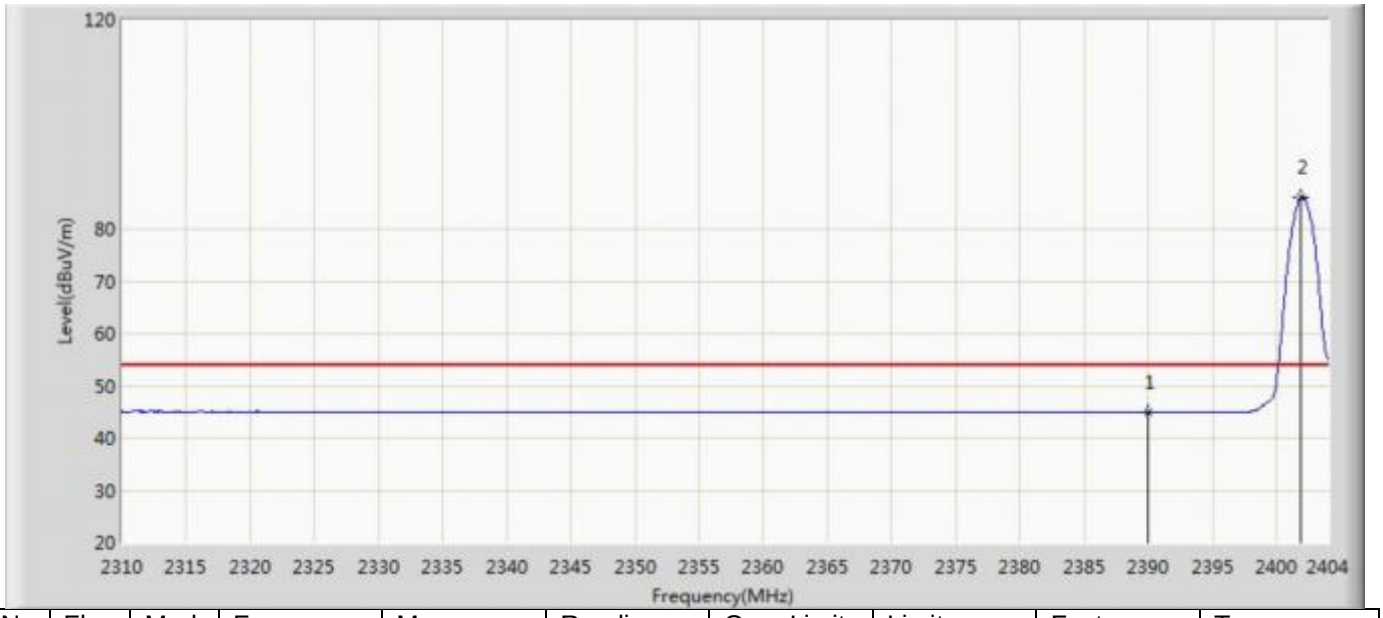
Transmit by DH5 at Channel 2402MHz Horizontal



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2382.662	59.372	28.156	-14.628	74.000	31.216	PK
2			2390.000	58.064	26.861	-15.936	74.000	31.203	PK
3		*	2402.026	96.891	65.707	N/A	N/A	31.184	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	44.881	13.678	-9.119	54.000	31.203	AV
2		*	2401.932	86.026	54.842	N/A	N/A	31.184	AV

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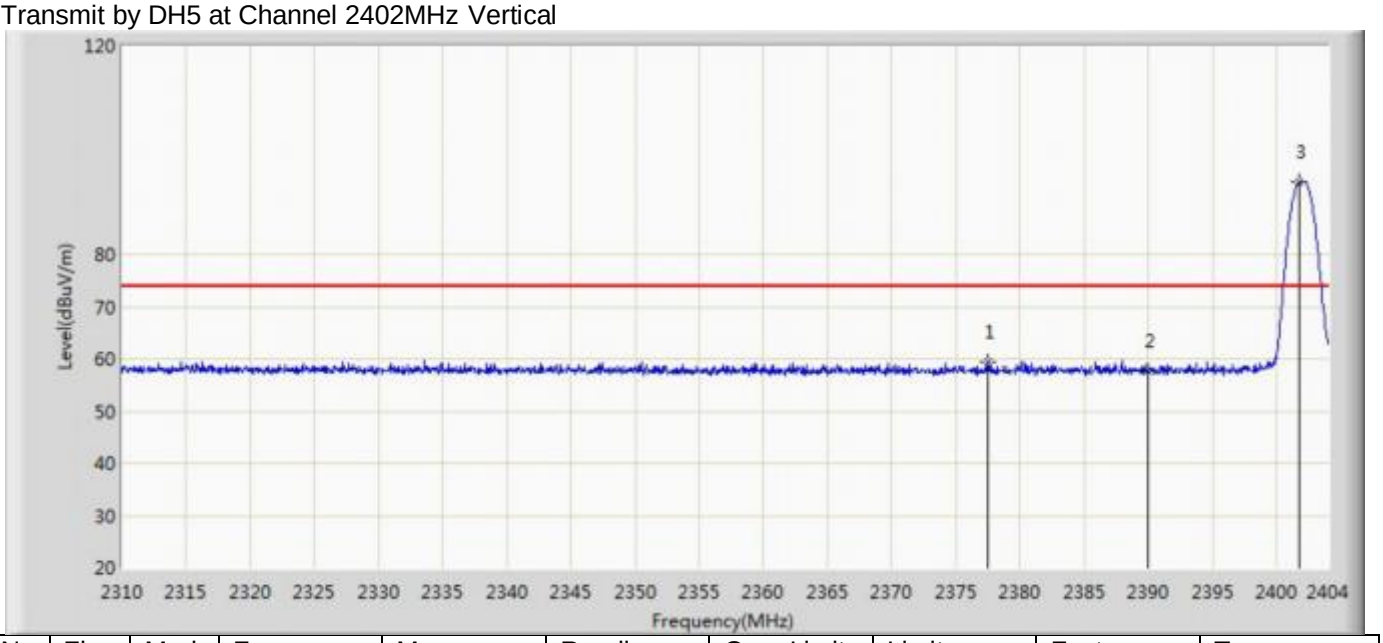
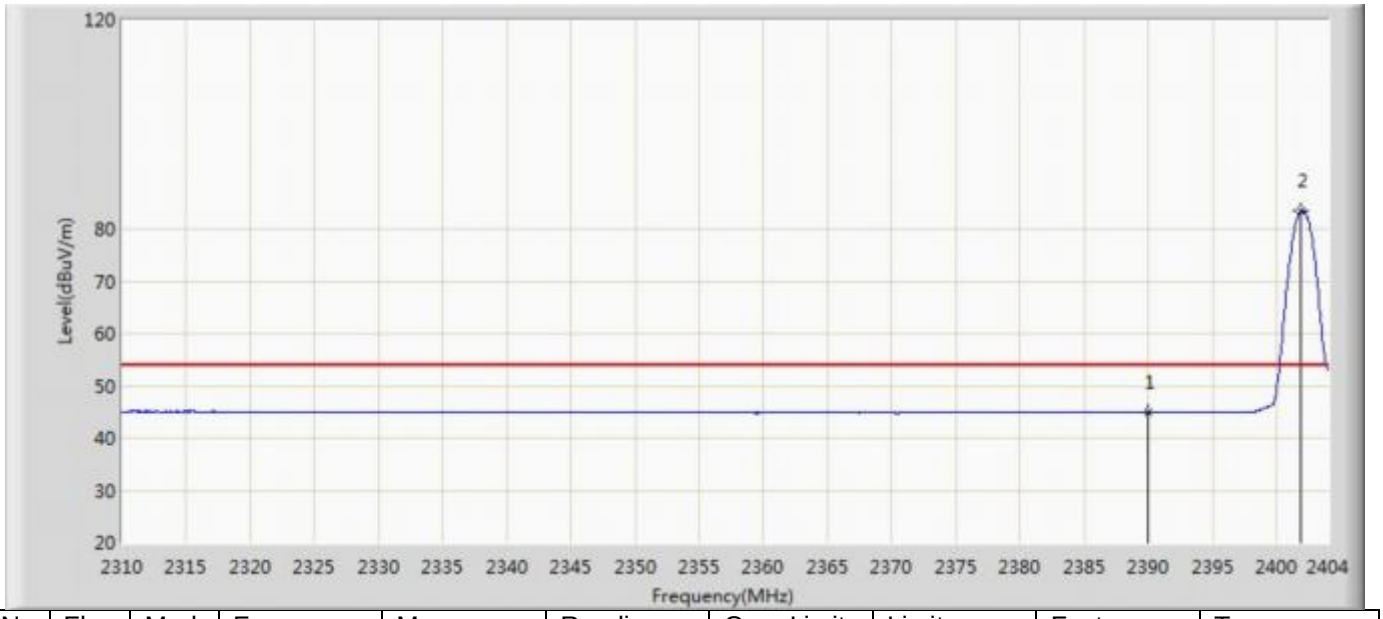
Transmit by DH5 at Channel 2402MHz Vertical



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2377.445	59.339	28.113	-14.661	74.000	31.225	PK
2			2390.000	57.761	26.558	-16.239	74.000	31.203	PK
3		*	2401.791	93.811	62.627	N/A	N/A	31.184	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	44.918	13.715	-9.082	54.000	31.203	AV
2		*	2401.932	83.537	52.353	N/A	N/A	31.184	AV

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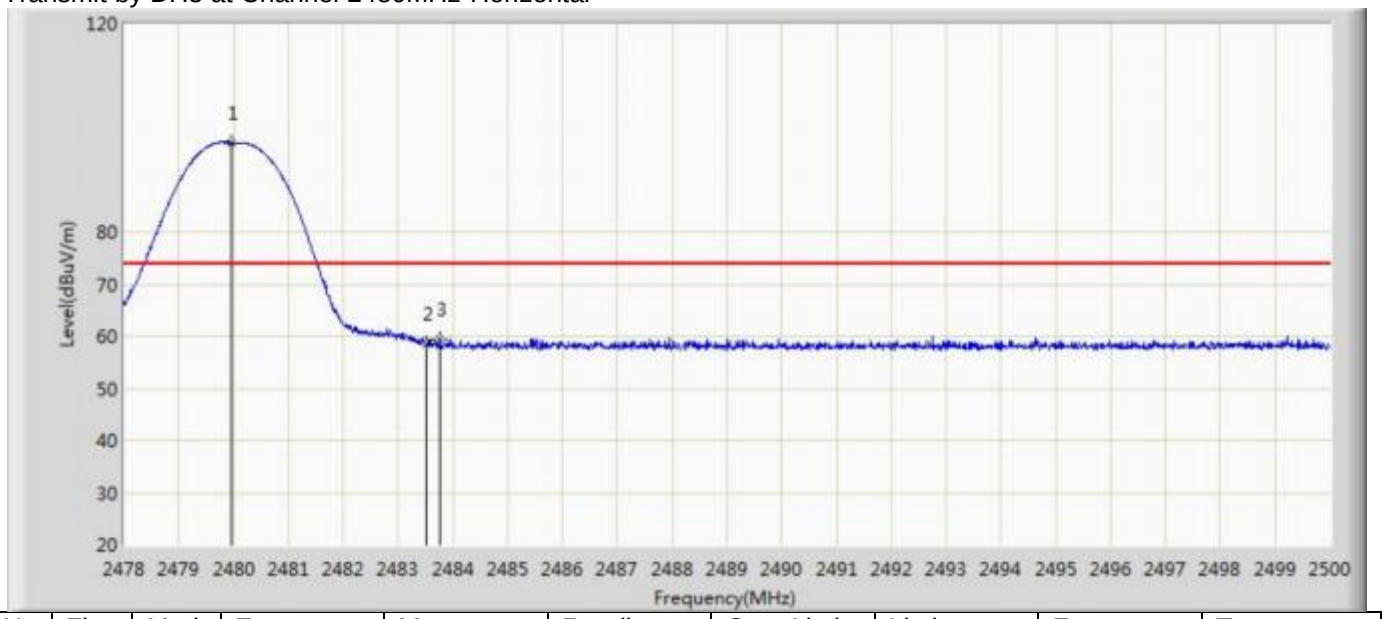
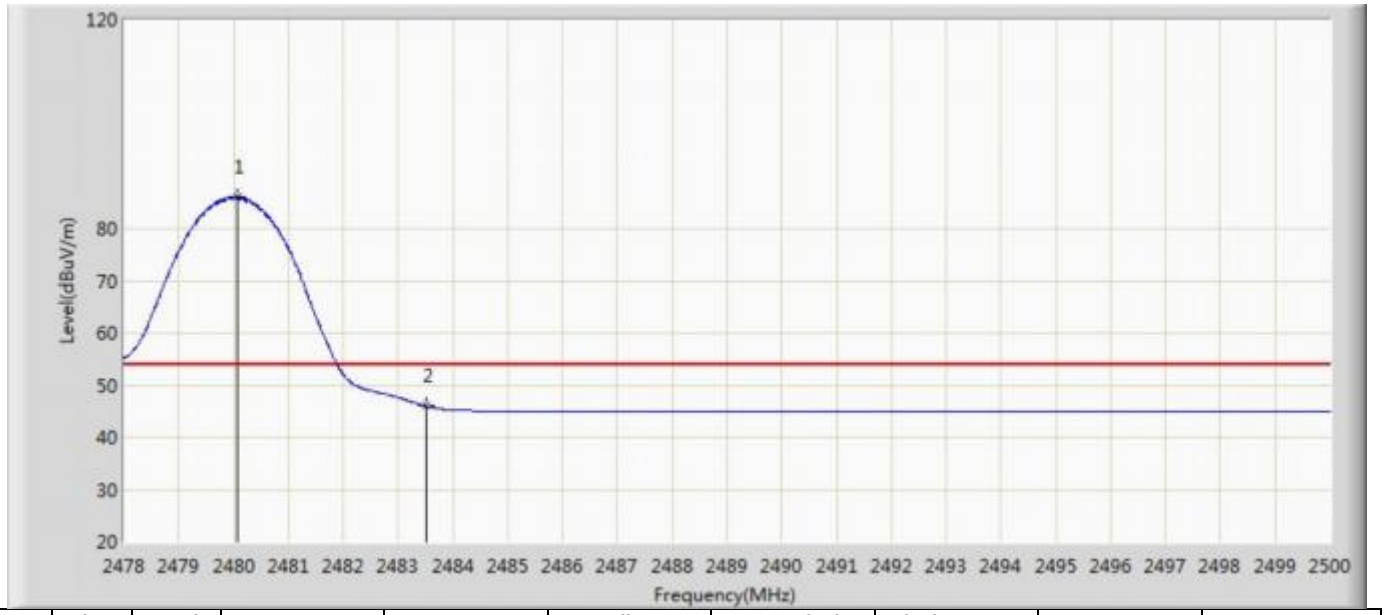
Transmit by DH5 at Channel 2480MHz Horizontal



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.969	97.220	66.036	N/A	N/A	31.184	PK
2			2483.500	58.439	27.246	-15.561	74.000	31.194	PK
3			2483.764	59.540	28.346	-14.460	74.000	31.194	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.079	86.070	54.886	N/A	N/A	31.184	AV
2			2483.500	46.010	14.817	-7.990	54.000	31.194	AV

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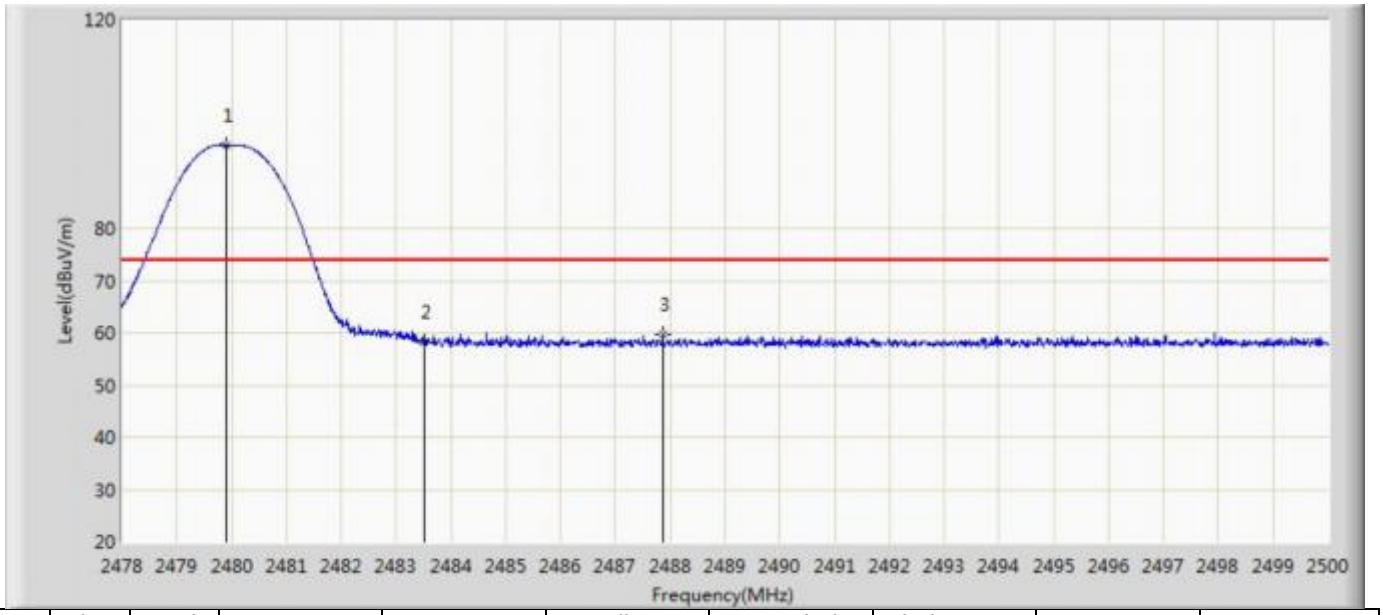
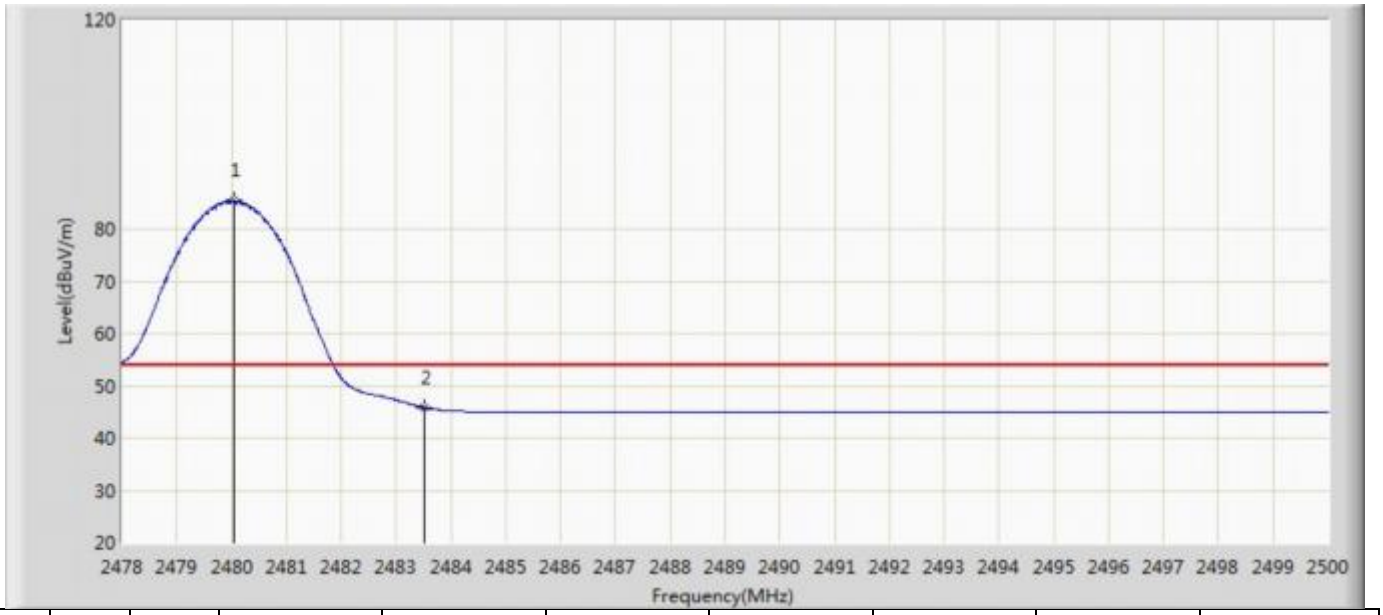
Transmit by DH5 at Channel 2480MHz Vertical



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.903	96.044	64.860	N/A	N/A	31.184	PK
2			2483.500	58.272	27.079	-15.728	74.000	31.194	PK
3			2487.856	59.753	28.548	-14.247	74.000	31.204	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.035	85.381	54.197	N/A	N/A	31.184	AV
2			2483.500	45.869	14.676	-8.131	54.000	31.194	AV

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2DH5

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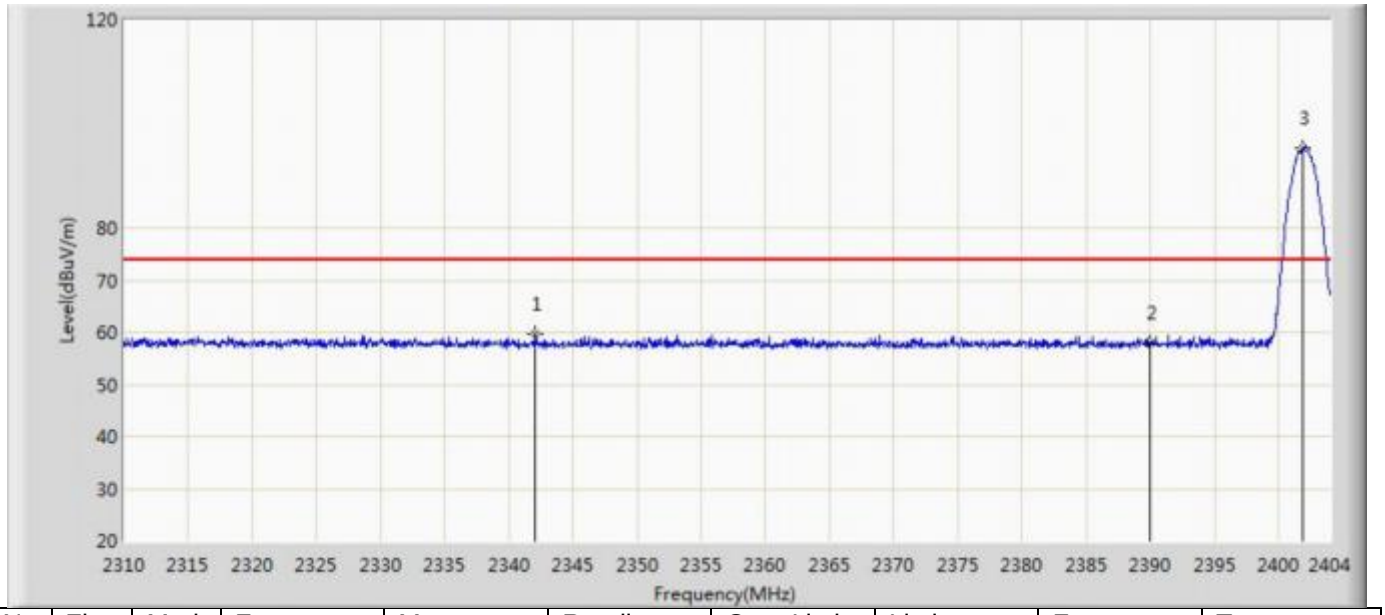
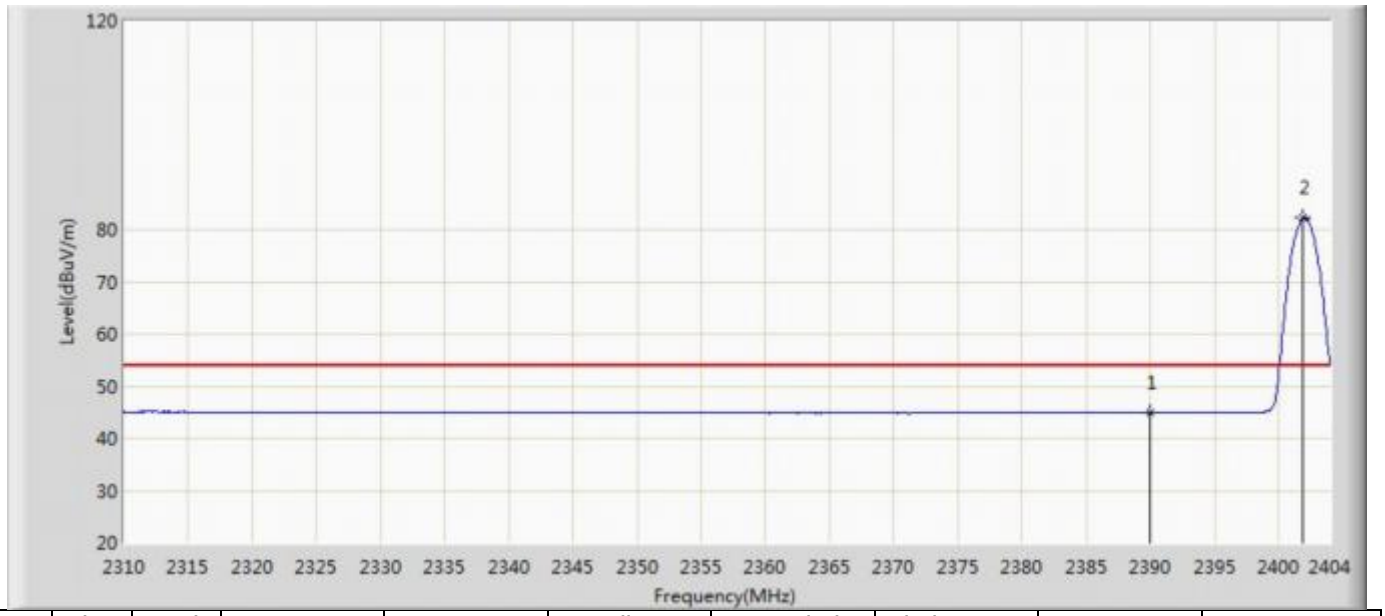
Transmit by 2DH5 at Channel 2402MHz Horizontal



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2342.054	59.677	28.355	-14.323	74.000	31.322	PK
2			2390.000	57.843	26.640	-16.157	74.000	31.203	PK
3		*	2401.885	95.385	64.201	N/A	N/A	31.184	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	44.936	13.733	-9.064	54.000	31.203	AV
2		*	2401.932	82.276	51.092	N/A	N/A	31.184	AV

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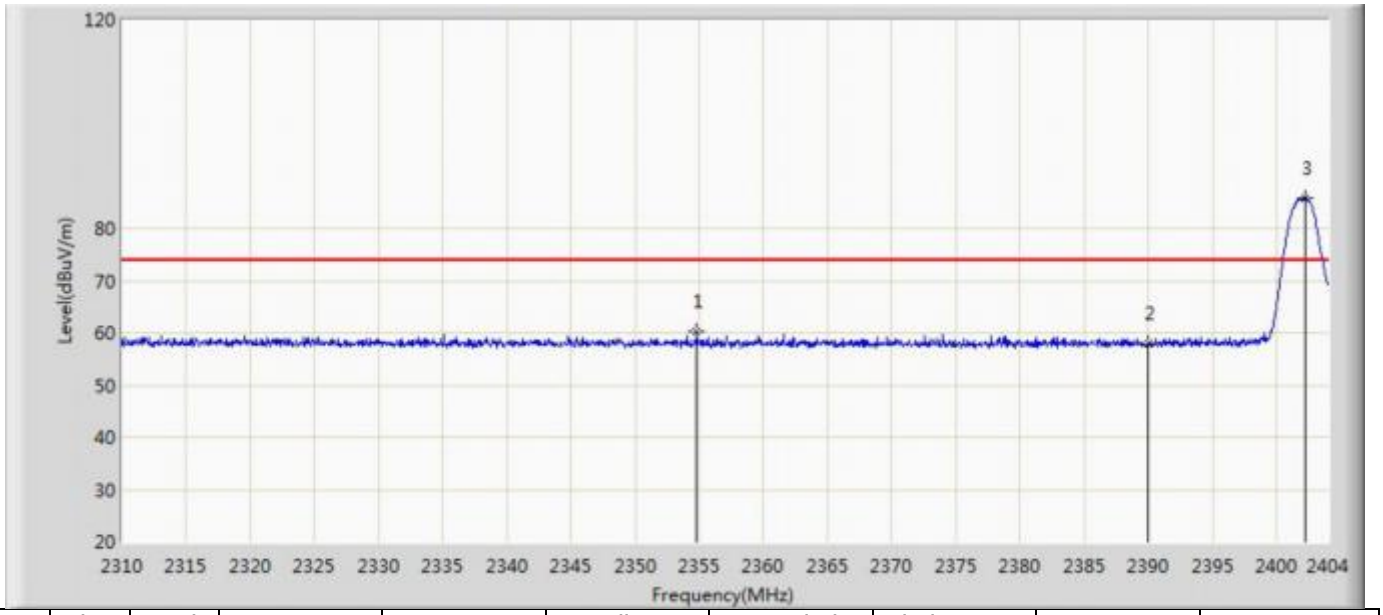
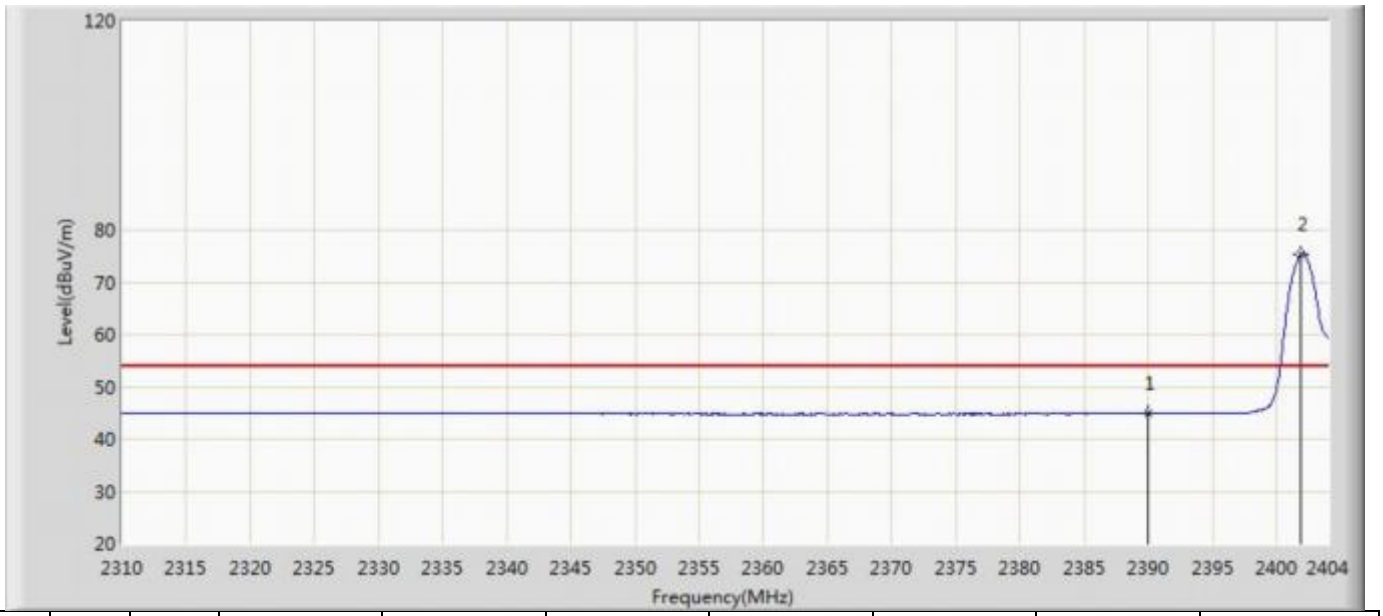
Transmit by 2DH5 at Channel 2402MHz Vertical



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2354.791	60.167	28.893	-13.833	74.000	31.275	PK
2			2390.000	58.073	26.870	-15.927	74.000	31.203	PK
3		*	2402.214	85.752	54.568	N/A	N/A	31.184	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	44.860	13.657	-9.140	54.000	31.203	AV
2		*	2401.932	75.506	44.322	N/A	N/A	31.184	AV

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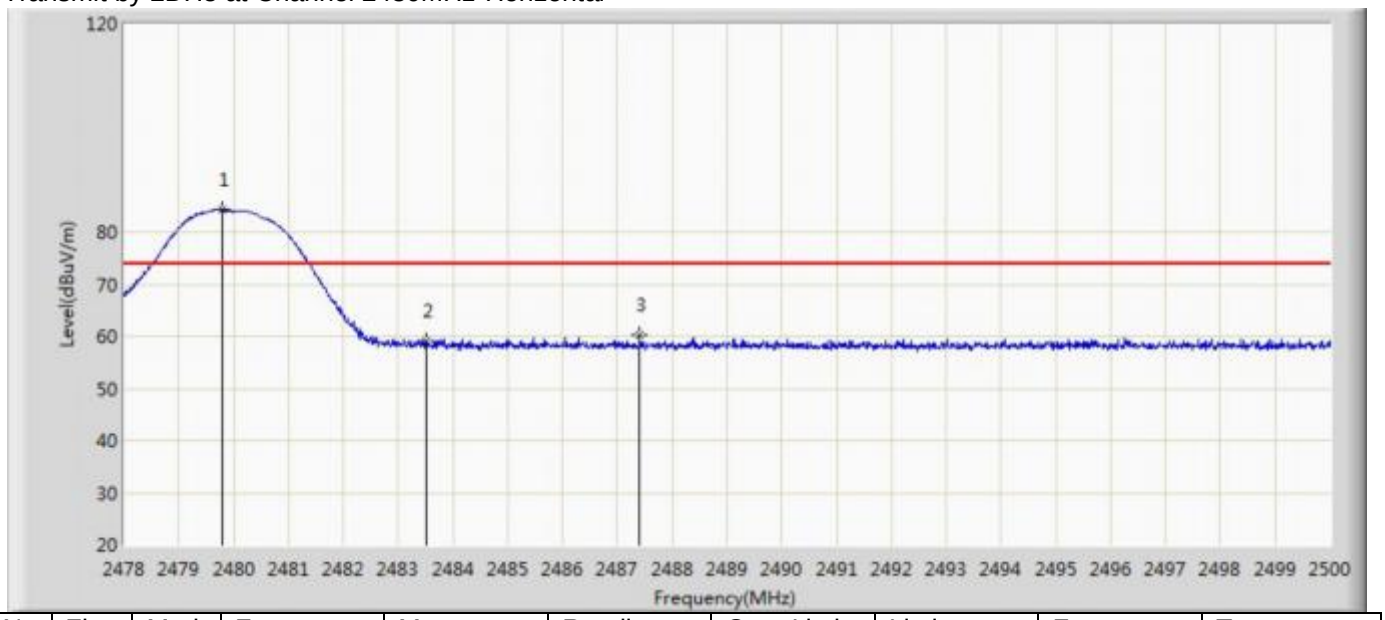
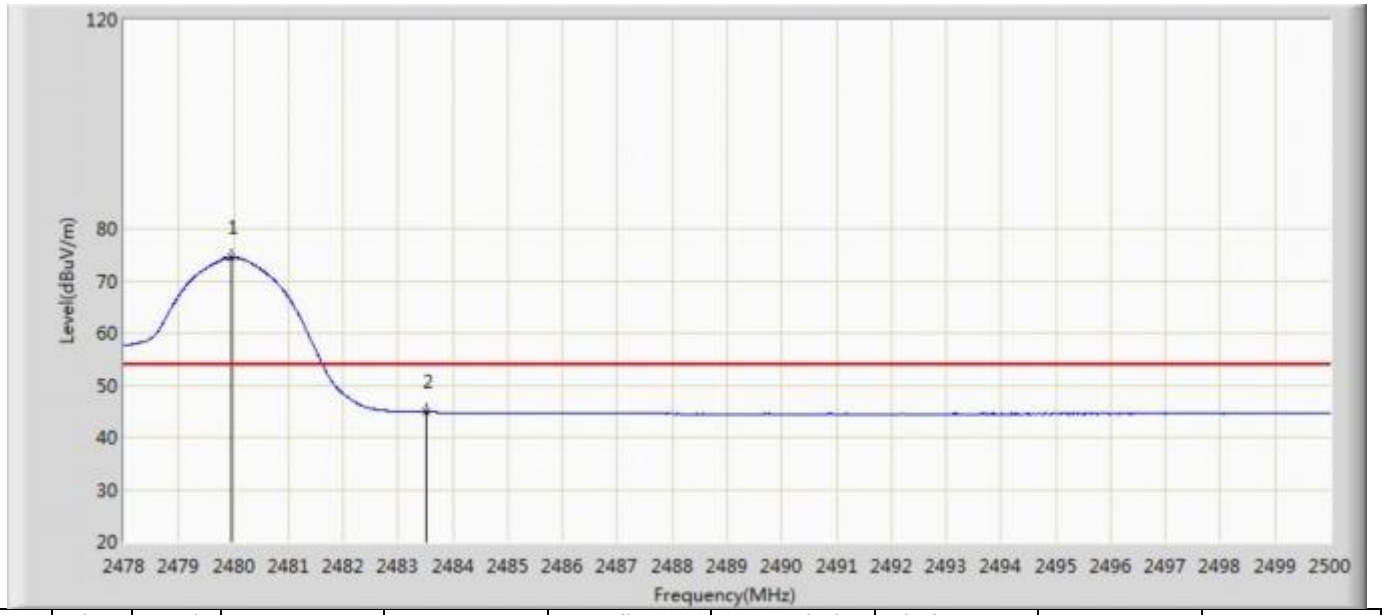
Transmit by 2DH5 at Channel 2480MHz Horizontal



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.804	84.275	53.091	N/A	N/A	31.184	PK
2			2483.500	59.231	28.038	-14.769	74.000	31.194	PK
3			2487.405	60.405	29.201	-13.595	74.000	31.204	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.969	74.389	43.205	N/A	N/A	31.184	AV
2			2483.500	44.852	13.659	-9.148	54.000	31.194	AV

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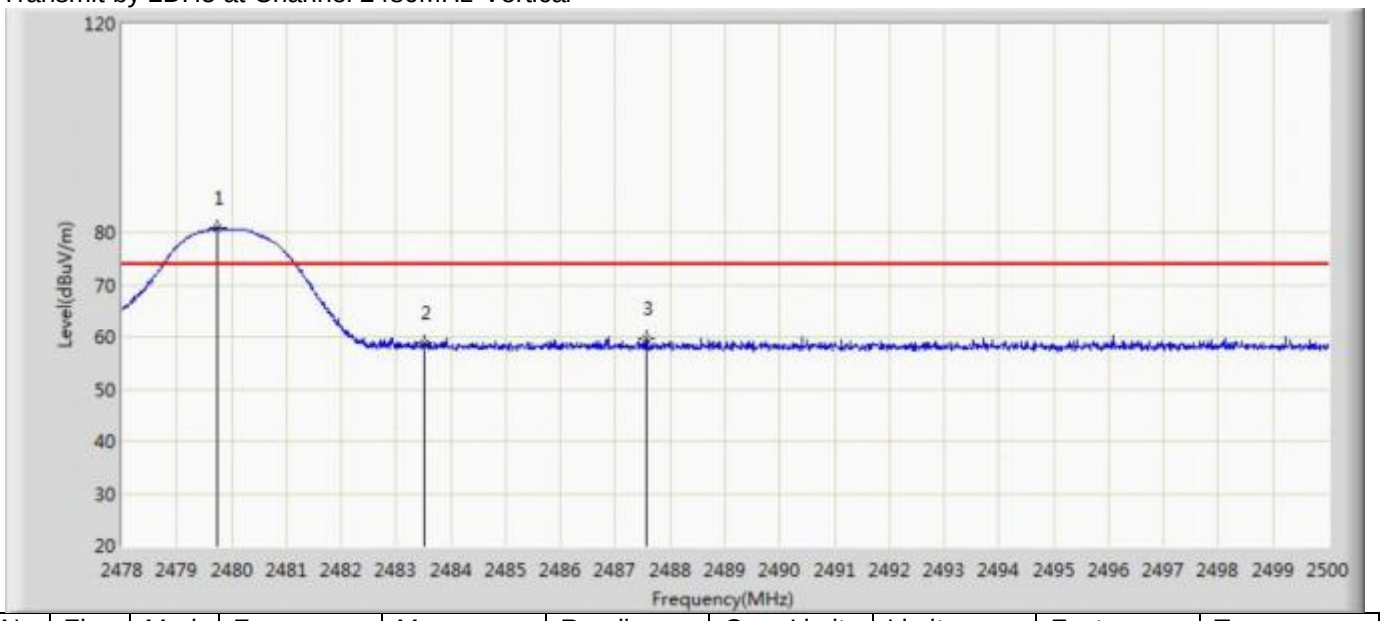
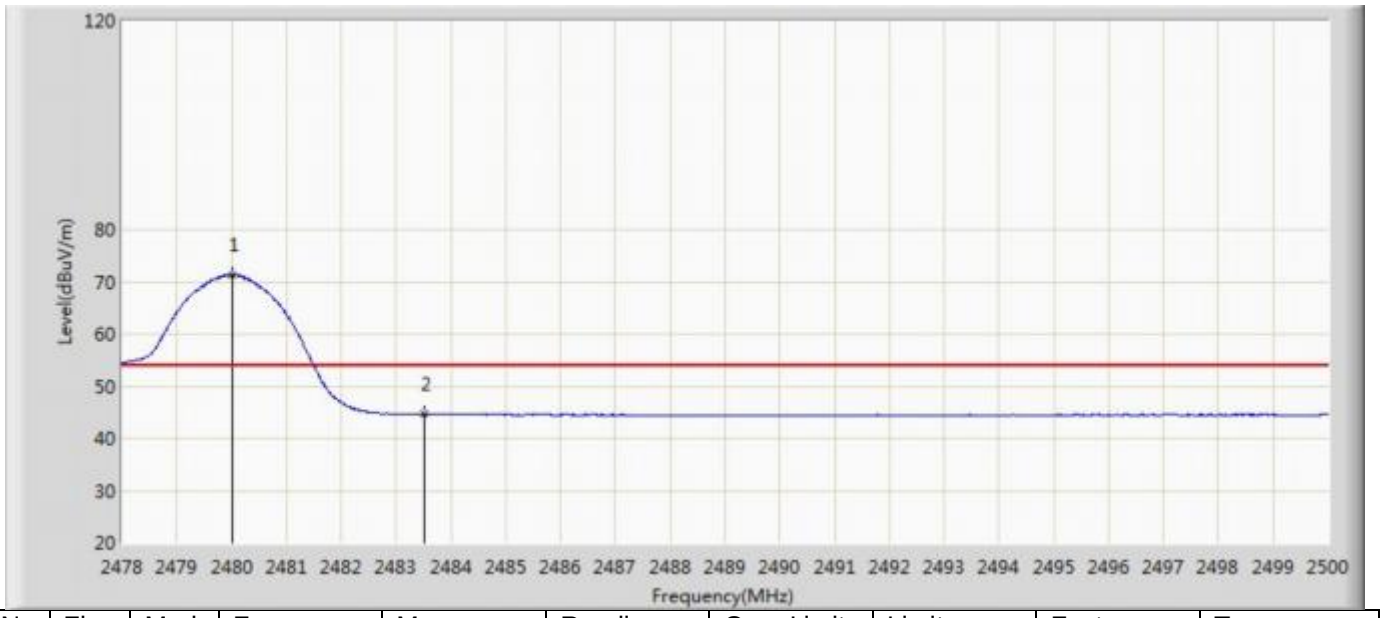
Transmit by 2DH5 at Channel 2480MHz Vertical



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.738	80.807	49.624	N/A	N/A	31.184	PK
2			2483.500	58.820	27.627	-15.180	74.000	31.194	PK
3			2487.559	59.709	28.505	-14.291	74.000	31.204	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.013	71.415	40.231	N/A	N/A	31.184	AV
2			2483.500	44.635	13.442	-9.365	54.000	31.194	AV

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Product Service

3DH5

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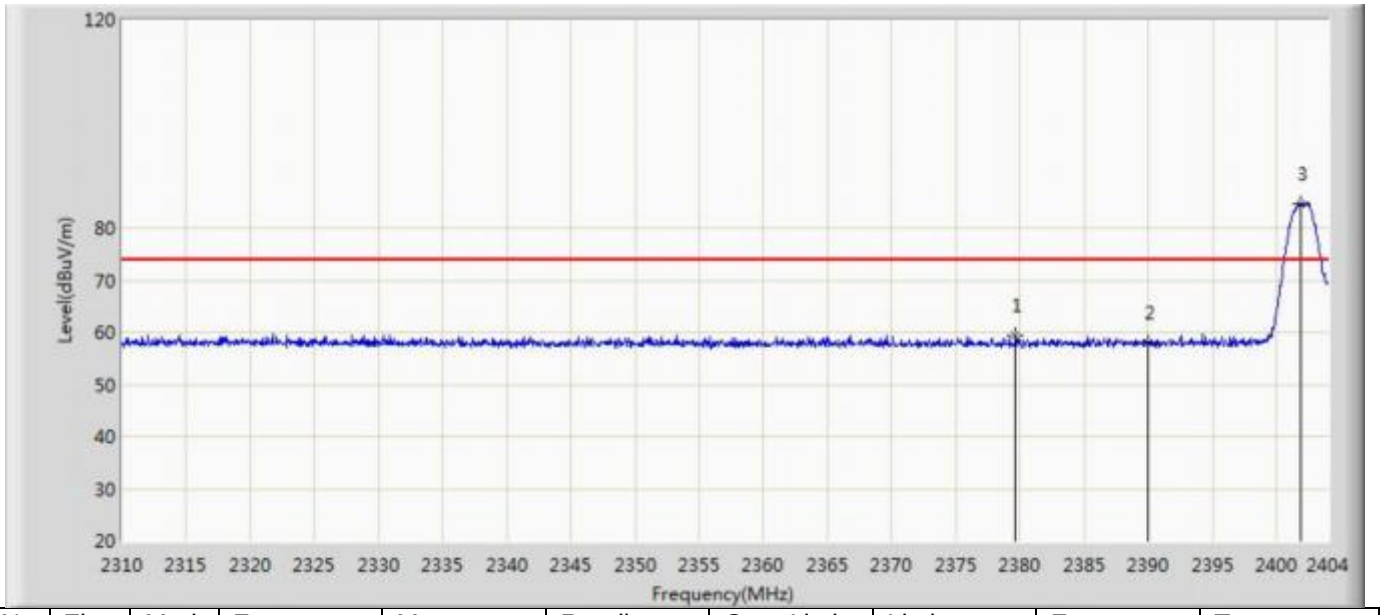
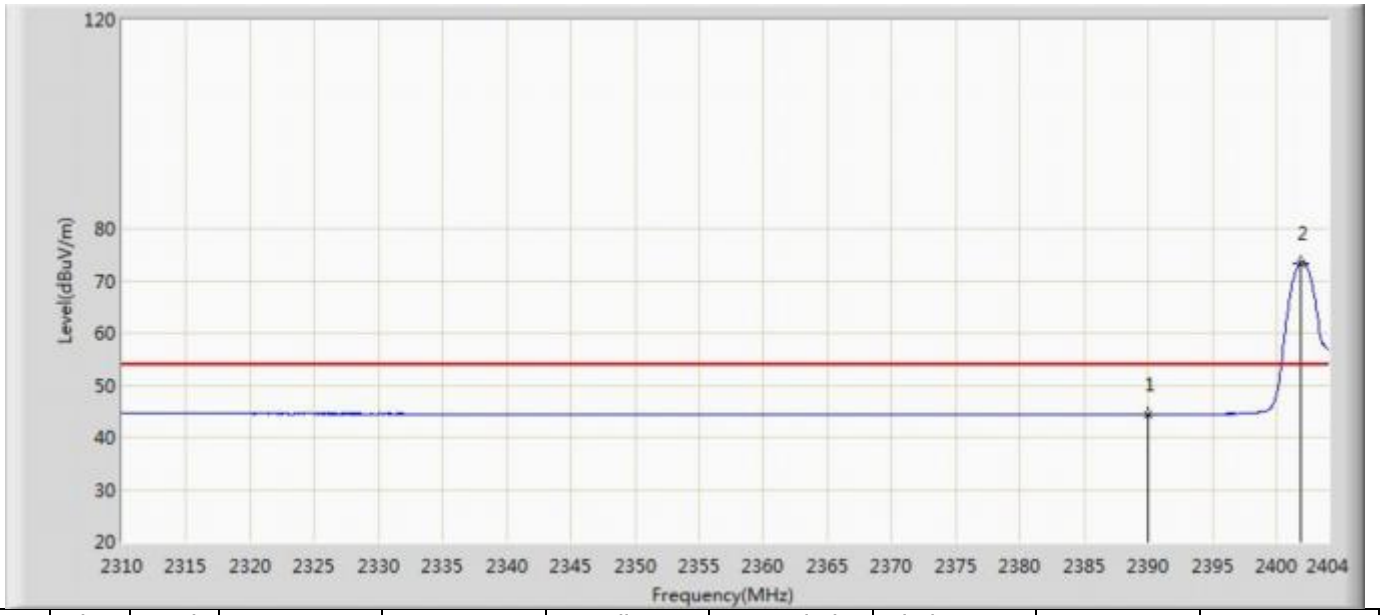
Transmit by 3DH5 at Channel 2402MHz Horizontal



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2379.654	59.458	28.236	-14.542	74.000	31.222	PK
2			2390.000	58.033	26.830	-15.967	74.000	31.203	PK
3		*	2401.838	84.763	53.579	N/A	N/A	31.184	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	44.400	13.197	-9.600	54.000	31.203	AV
2		*	2401.885	73.453	42.269	N/A	N/A	31.184	AV

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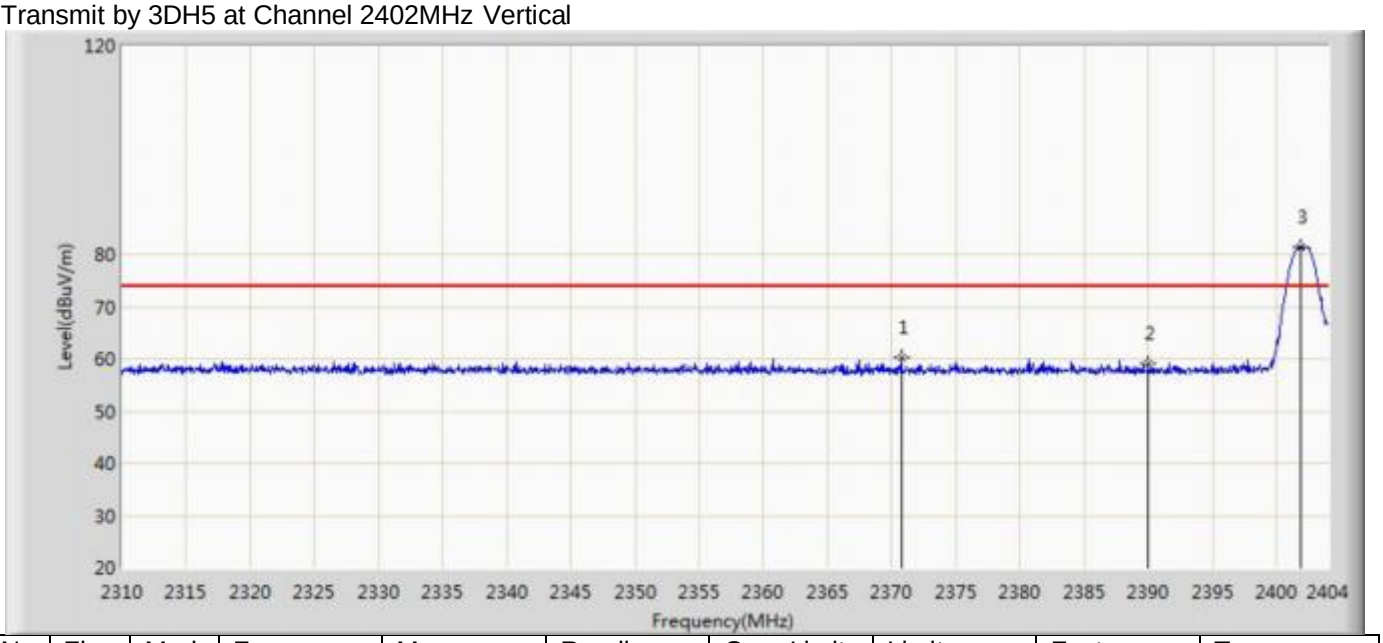
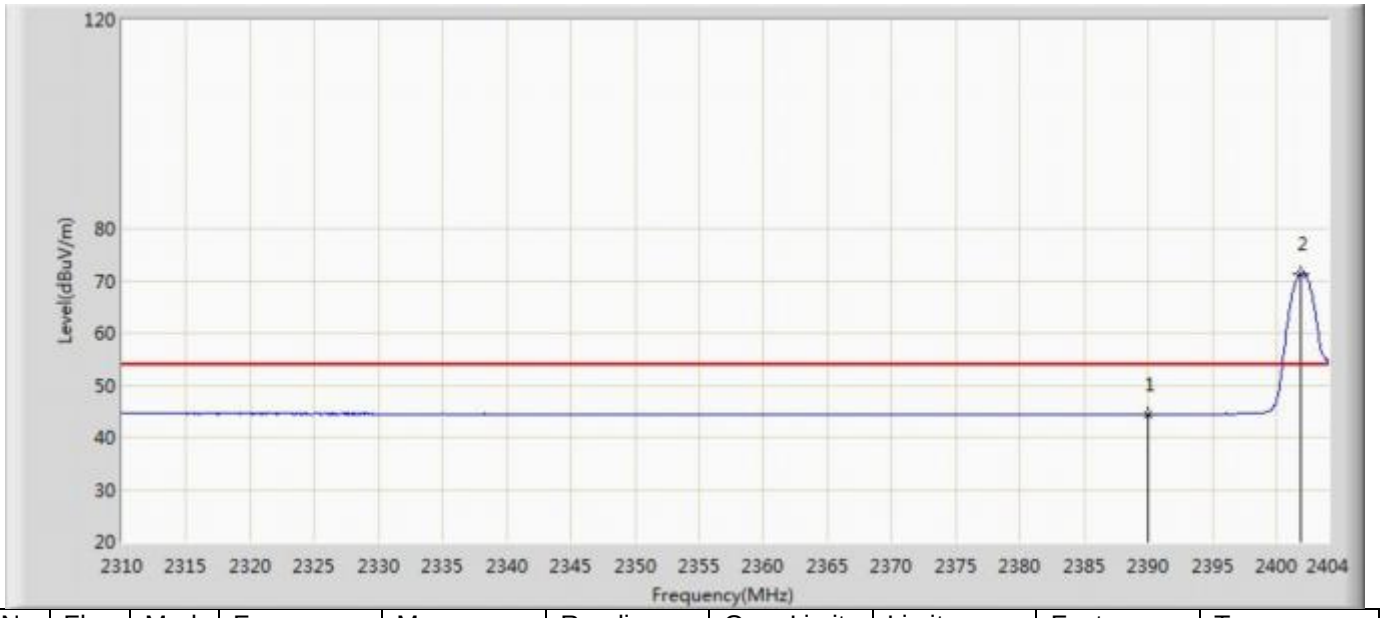
Transmit by 3DH5 at Channel 2402MHz Vertical



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2370.724	60.404	29.166	-13.596	74.000	31.239	PK
2			2390.000	59.002	27.799	-14.998	74.000	31.203	PK
3		*	2401.885	81.390	50.206	N/A	N/A	31.184	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	44.448	13.245	-9.552	54.000	31.203	AV
2		*	2401.932	71.426	40.242	N/A	N/A	31.184	AV

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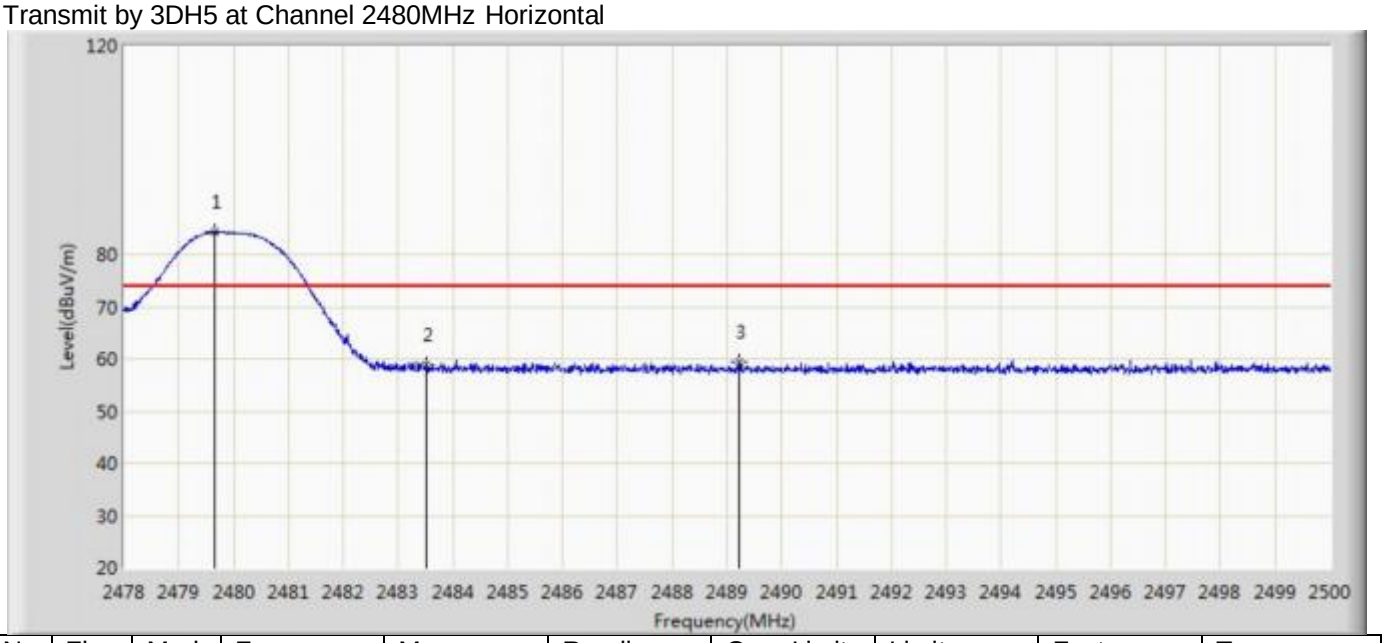
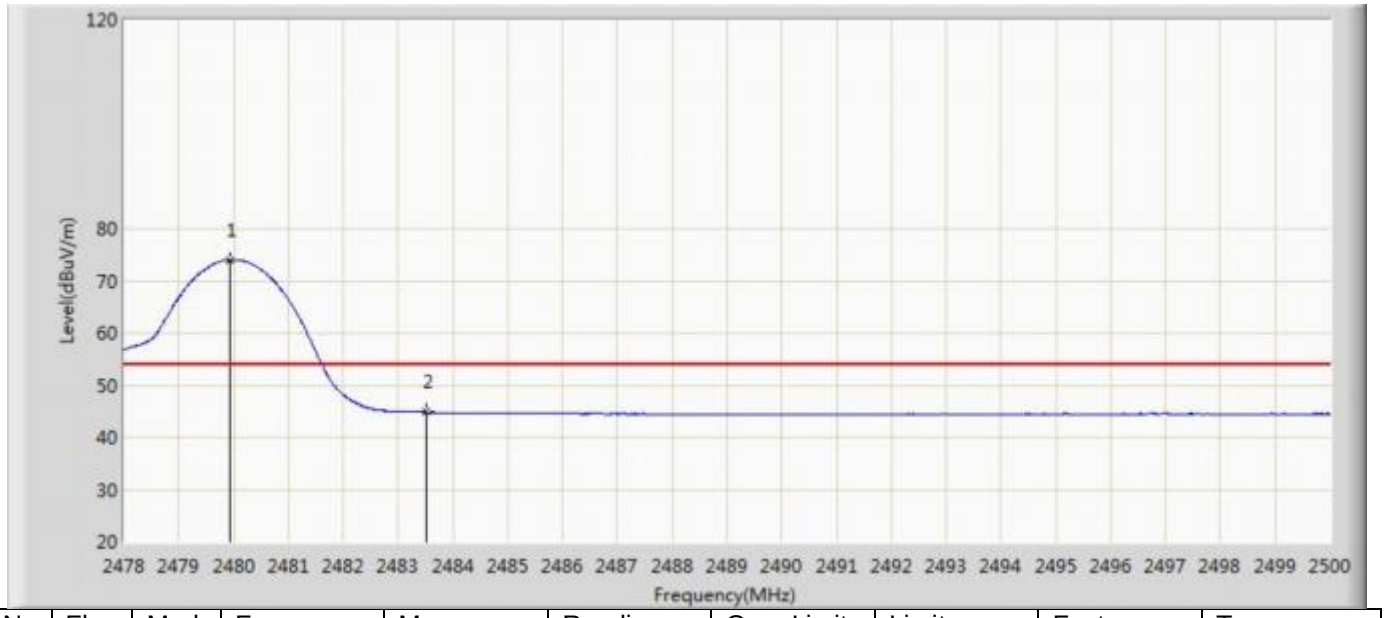
Transmit by 3DH5 at Channel 2480MHz Horizontal



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.661	84.330	53.147	N/A	N/A	31.184	PK
2			2483.500	58.725	27.532	-15.275	74.000	31.194	PK
3			2489.209	59.289	28.081	-14.711	74.000	31.208	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.936	74.042	42.858	N/A	N/A	31.184	AV
2			2483.500	44.807	13.614	-9.193	54.000	31.194	AV

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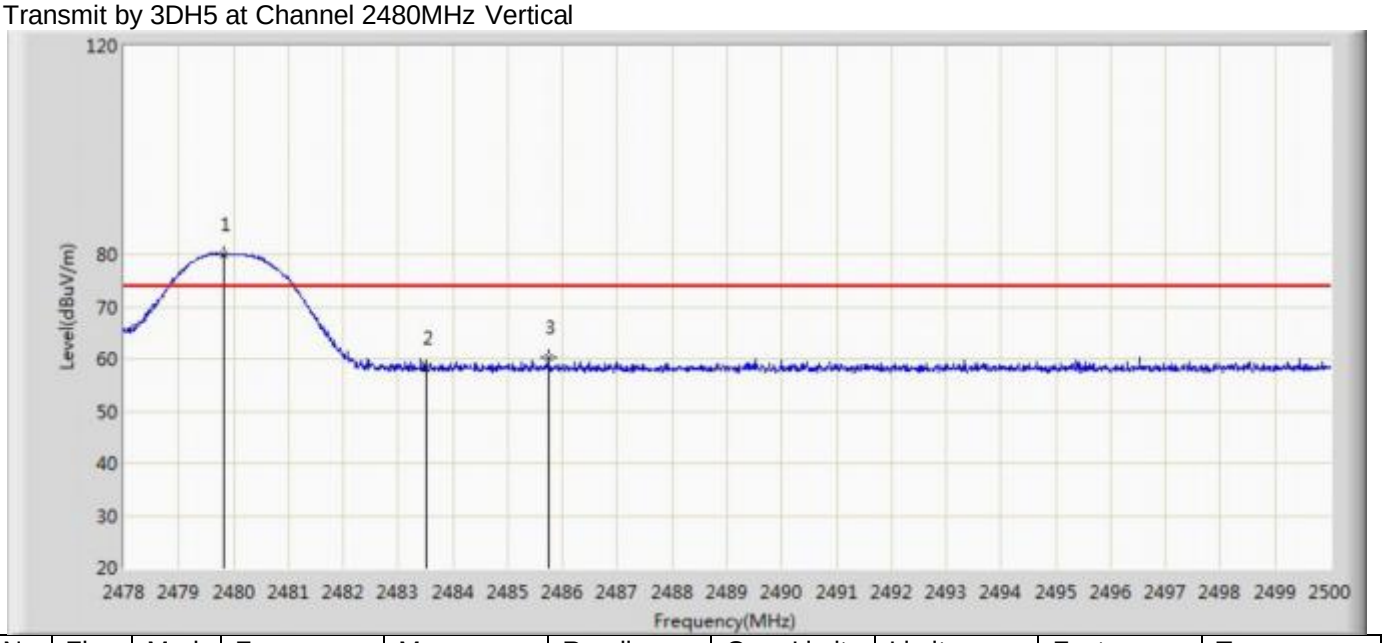
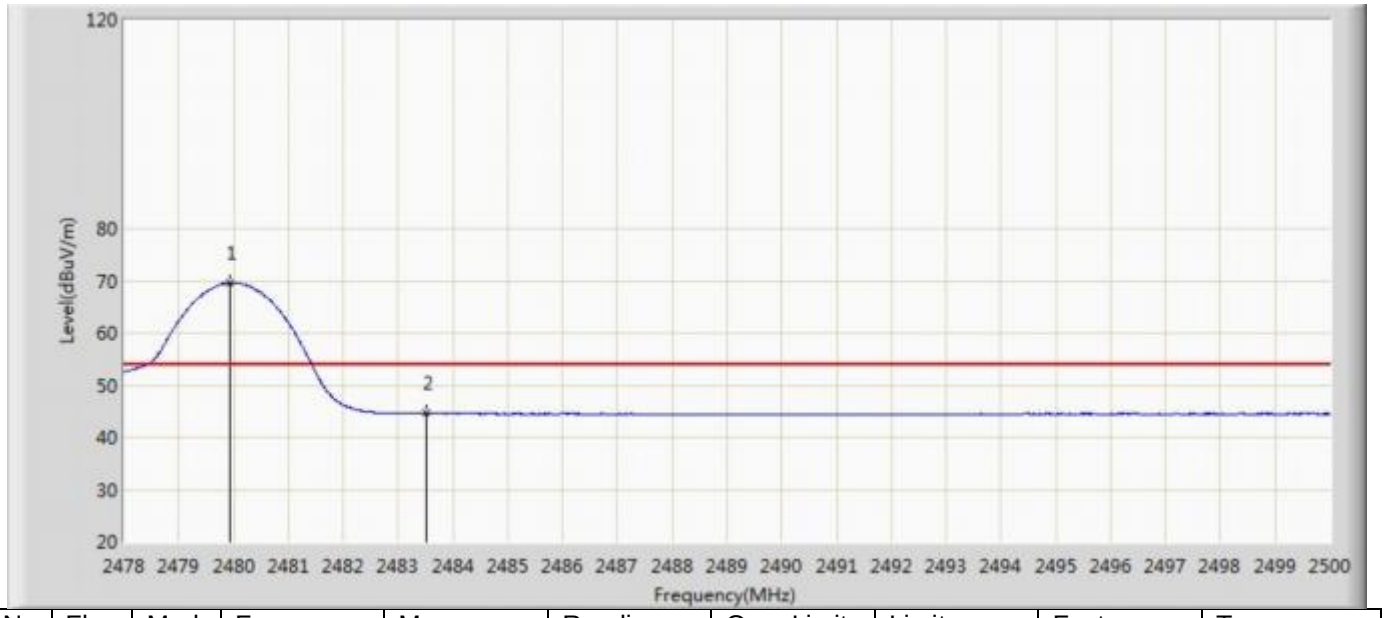
Transmit by 3DH5 at Channel 2480MHz Vertical



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.815	80.141	48.957	N/A	N/A	31.184	PK
2			2483.500	58.171	26.978	-15.829	74.000	31.194	PK
3			2485.744	60.309	29.110	-13.691	74.000	31.200	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.936	69.558	38.374	N/A	N/A	31.184	AV
2			2483.500	44.509	13.316	-9.491	54.000	31.194	AV

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9.9 Spurious radiated emissions for transmitter and receiver

Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
   Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-2009 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
   The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(duty cycle/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limit

The radio emission outside the operating frequency band 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. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

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Spurious radiated emissions for transmitter and receiver

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

The only worse case (which is subject to the maximum EIRP, DH5 mode) test result is listed in the report.

Transmitting spurious emission test result as below:

DH5 2402MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4799.5	49.602	H	74	PK	-24.398	Pass
7205	50.977	H	74	PK	-23.023	Pass
4799.5	45.426	V	74	PK	-28.574	Pass
7205	50.404	V	74	PK	-23.596	Pass

DH5 2441MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4884.5	50.16	H	74	PK	-23.84	Pass
7324	51.139	H	74	PK	-22.861	Pass
4884.5	47.633	V	74	PK	-26.367	Pass
7324	48.756	V	74	PK	-25.244	Pass

DH5 2480MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4961	50.166	H	74	PK	-23.834	Pass
7443	51.375	H	74	PK	-22.625	Pass
4961	47.25	V	74	PK	-26.75	Pass
7443	49.916	V	74	PK	-24.084	Pass

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2DH5 2402MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4808	46.595	H	74	PK	-27.405	Pass
7205	46.477	H	74	PK	-27.523	Pass
4791	42.6	V	74	PK	-31.4	Pass
7205	46.285	V	74	PK	-27.715	Pass

2DH5 2441MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4884.5	48.077	H	74	PK	-25.923	Pass
7324	47.009	H	74	PK	-26.991	Pass
4884.5	44.099	V	74	PK	-29.901	Pass
7324	46.975	V	74	PK	-27.025	Pass

2DH5 2480MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4961	47.291	H	74	PK	-26.709	Pass
7443	48.937	H	74	PK	-25.063	Pass
4961	44.054	V	74	PK	-29.946	Pass
7443	46.474	V	74	PK	-27.526	Pass

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3DH5 2402MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4808	46.289	H	74	PK	-27.711	Pass
7205	47.844	H	74	PK	-26.156	Pass
4799.5	44.229	V	74	PK	-29.771	Pass
7205	46.313	V	74	PK	-27.687	Pass

3DH5 2441MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4884.5	47.481	H	74	PK	-26.519	Pass
7324	48.114	H	74	PK	-25.886	Pass
4884.5	44.658	V	74	PK	-29.342	Pass
7324	46.193	V	74	PK	-27.807	Pass

3DH5 2480MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4961	47.087	H	74	PK	-26.913	Pass
7443	47.595	H	74	PK	-26.405	Pass
4961	43.984	V	74	PK	-30.016	Pass
7443	47.573	V	74	PK	-26.427	Pass

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10 Test Equipment List

List of Test Instruments

Conducted Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2016/11/03
Temperature/Humidity Meter	Ouleinuo	N/A	MRTSUE06114	1 year	2016/11/20

Radiated Emission

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	MRTSUE06028	1 year	2016/12/08
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2016/11/03
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2016/04/16
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2016/03/29
Loop Antenna	Schwarzbeck	FMZB1519	MRTSUE06025	1 year	2016/12/14
TRILOG Antenna	Schwarzbeck	VULB9162	MRTSUE06022	1 year	2016/11/07
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2016/11/07
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2016/01/05
Temperature/Humidity Meter	Ouleinuo	N/A	MRTSUE06115	1 year	2016/11/20

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2016/05/08
USB Wideband Power Sensor	Boonton	55006	MRTSUE06109	1 year	2016/05/08
Temperature/Humidity Meter	Ouleinuo	N/A	MRTSUE06112	1 year	2016/11/20

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- 20dB bandwidth and 99% Occupied Bandwidth
- Carrier frequency separation
- Number of hopping frequencies
- Dwell Time
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

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11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 9kHz-1000MHz	4.18dB
Uncertainty for Radiated Emission in 3m chamber 1000MHz-40000MHz	4.76dB
Uncertainty for Conducted Emission 150KHz-30MHz	3.46dB

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Product Service

12 Photographs of Test Set-ups

Conducted Emission Setup

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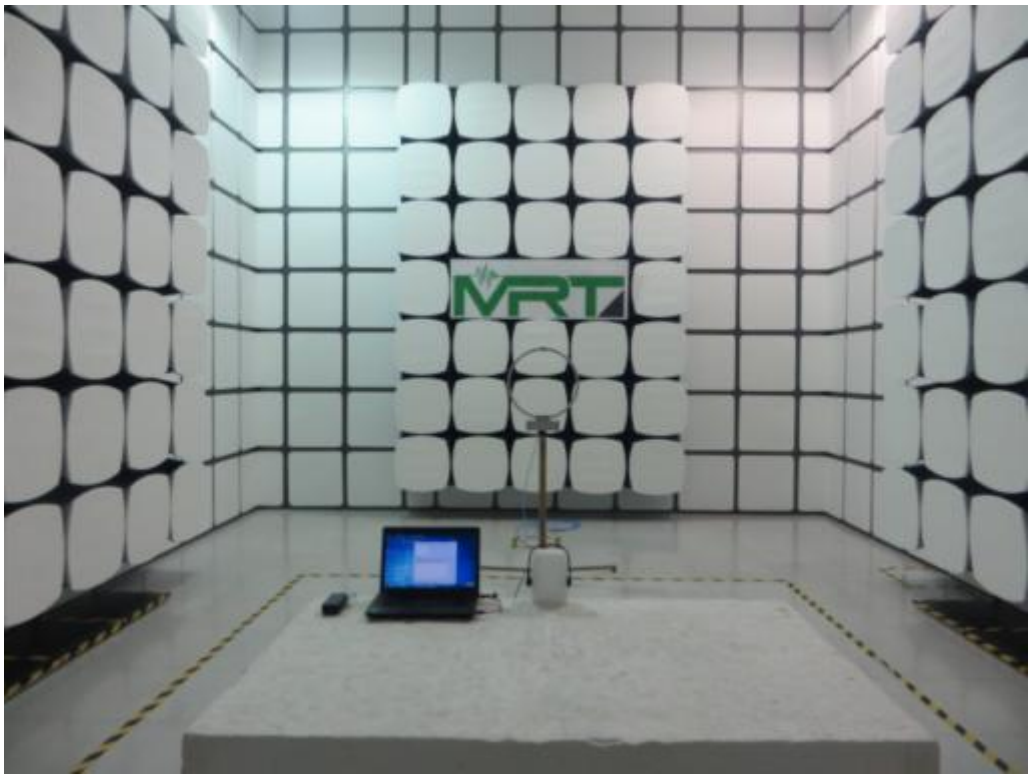
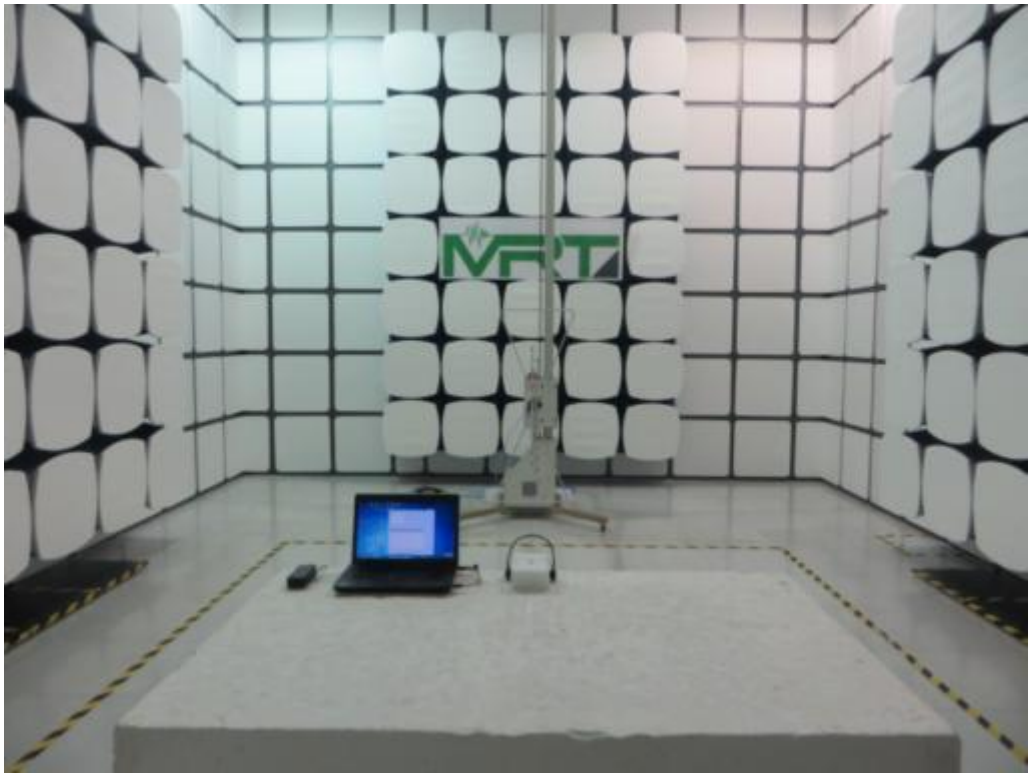
Radiated Emission Setup
9k~30MHz



30MHz~1GHz



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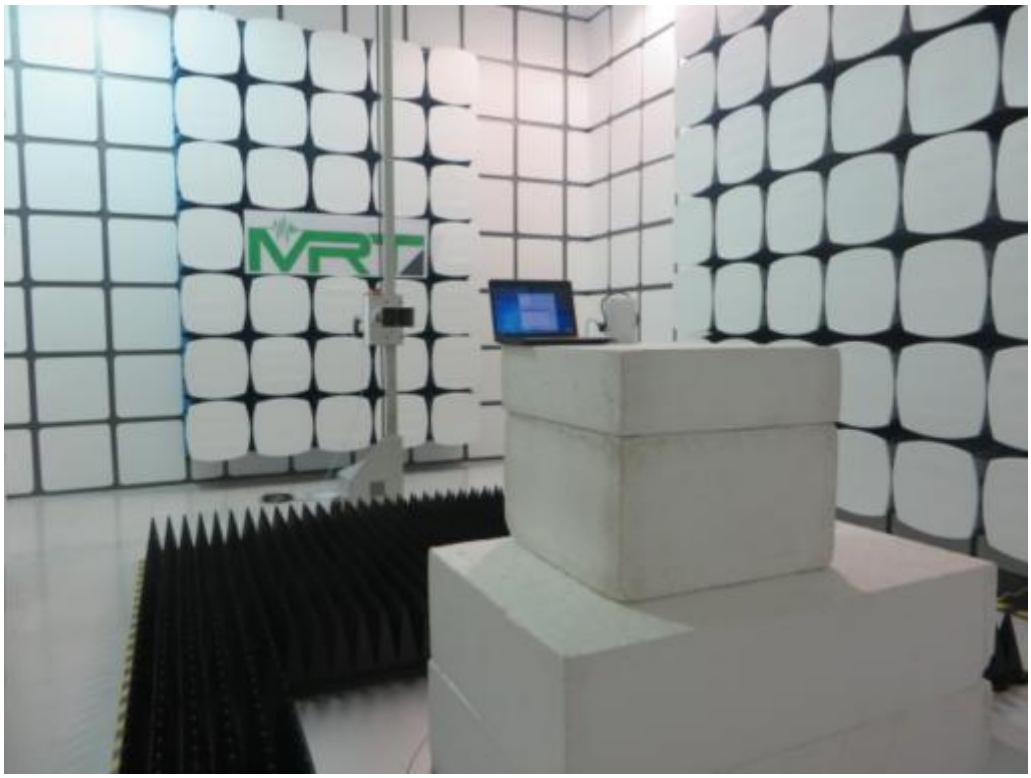
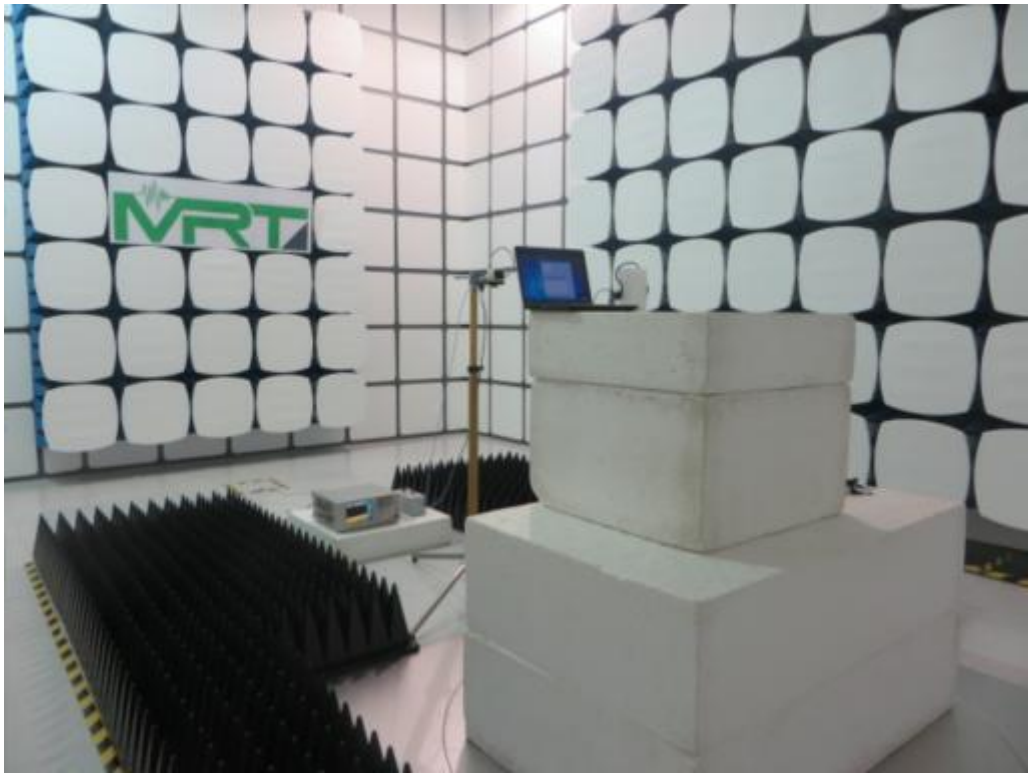
1GHz~18GHz



18GHz~40GHz



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Product Service

13 Photographs of EUT

External Photographs

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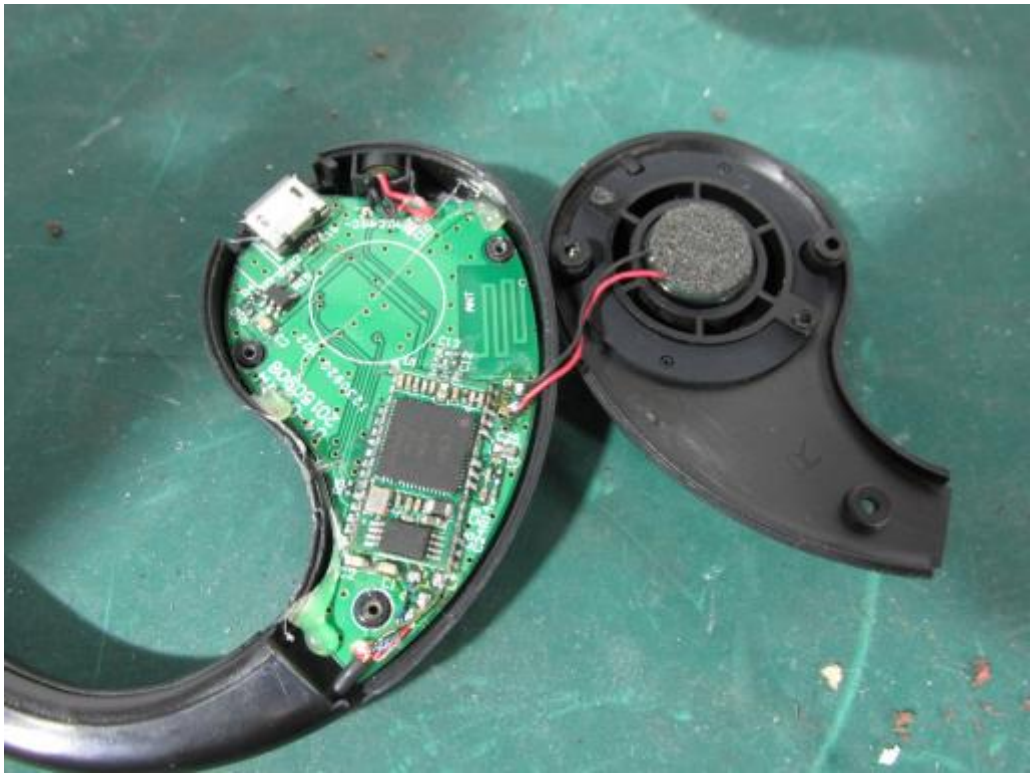
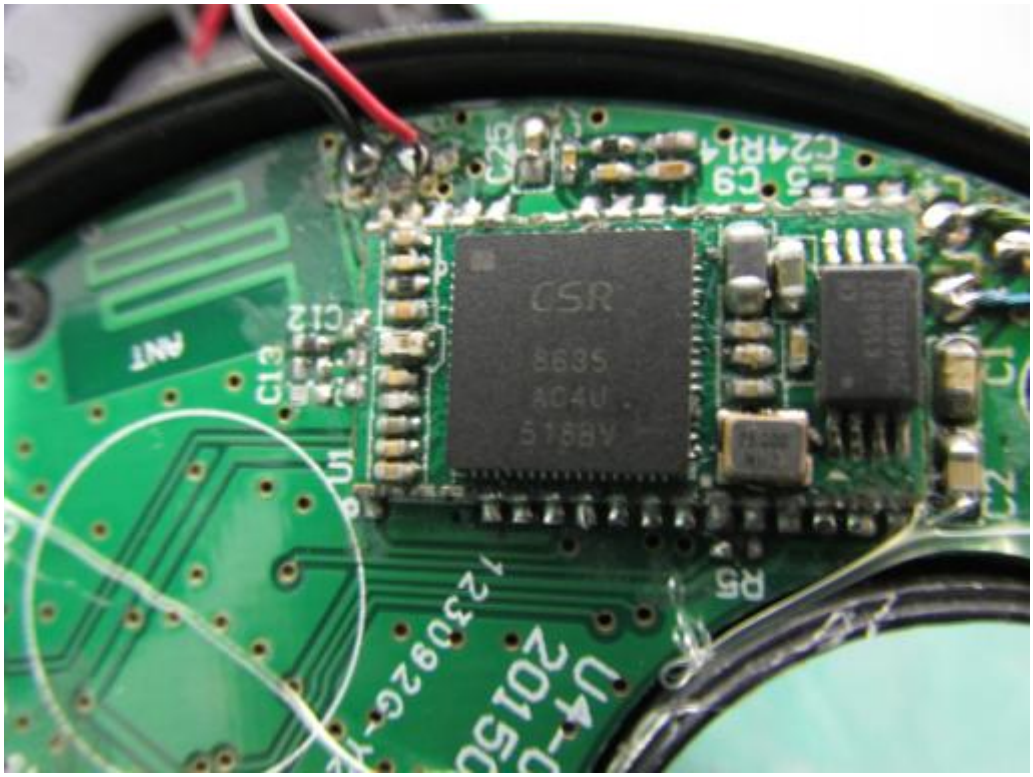
Internal Photographs





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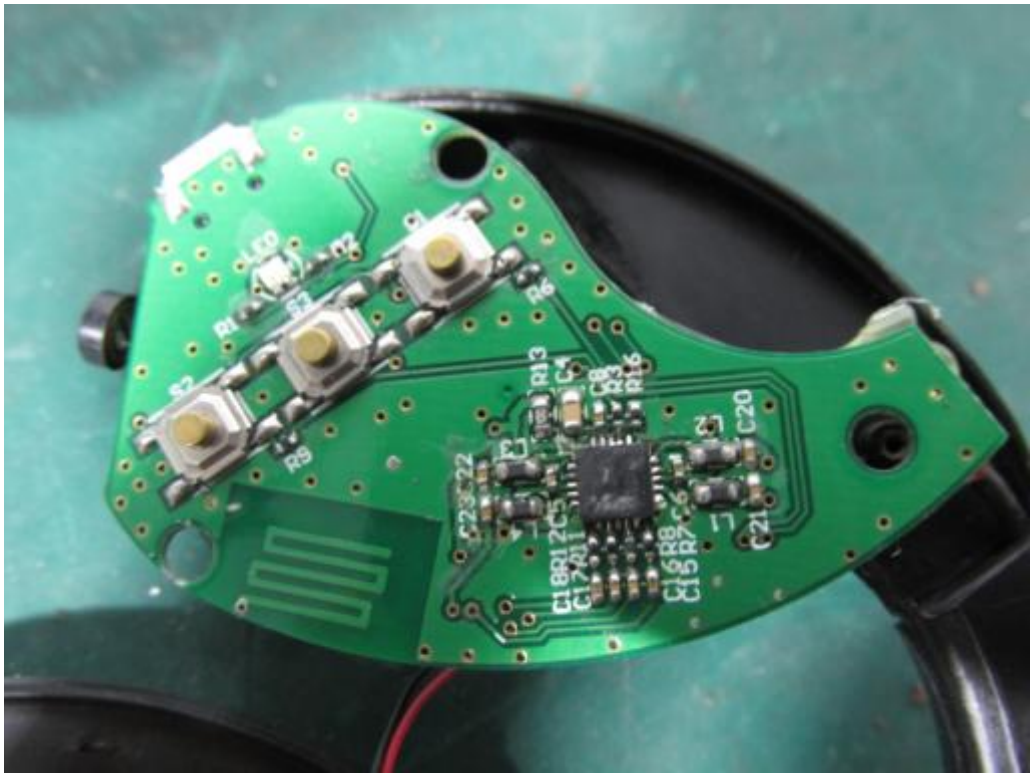

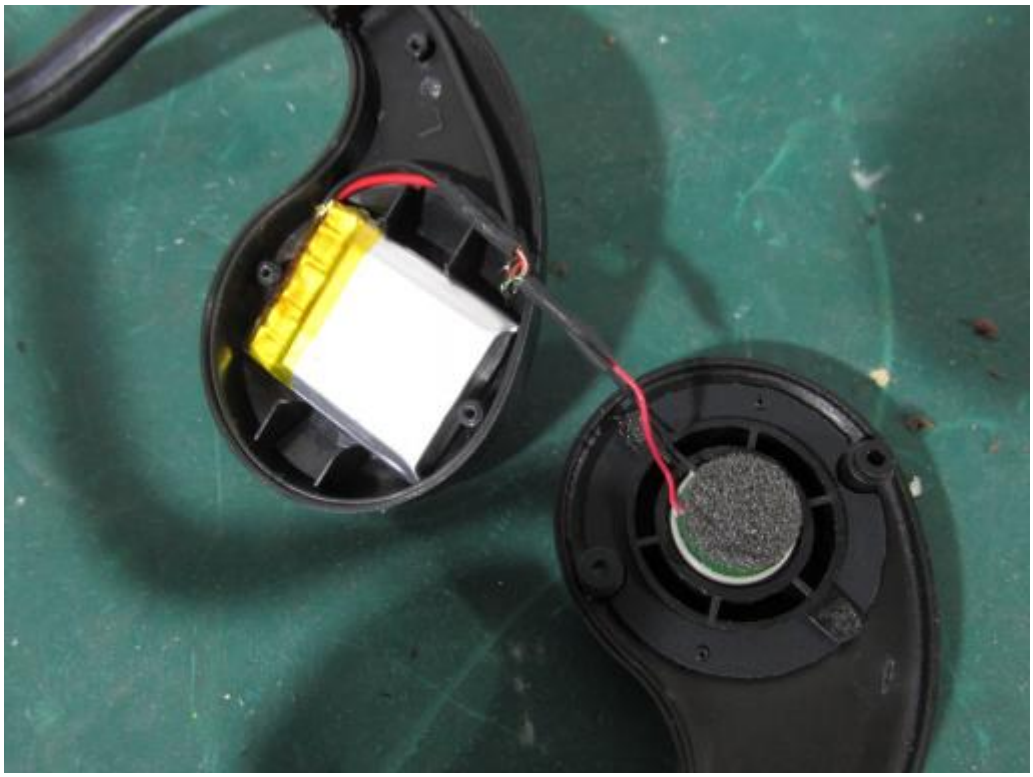

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