



# Test Report

FCC ID: 2AXIE-STICK02

Date of issue: Oct. 22, 2020

Report number: MTi20082708-1E1

Sample description: Z-WAVE STATIC CONTROLLER

Model(s): HKZW-STICK02, ZST10 700

Applicant: HANK SMART TECH CO., LTD

Address: Unit 1419, floor 14th, Block5, Cloud Park Phase 2, Bantian street,  
Longgang District, Shenzhen China

Date of test: Sept. 16, 2020 –Oct. 22, 2020

**Shenzhen Microtest Co., Ltd.**  
<http://www.mtitest.com>

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# Test Result Certification

Applicant's name: HANK SMART TECH CO., LTD

Address: Unit 1419, floor 14th, Block5, Cloud Park Phase 2, Bantian street, Longgang District, Shenzhen China

Manufacture's name: HANK SMART TECH CO., LTD

Address: Unit 1419, floor 14th, Block5, Cloud Park Phase 2, Bantian street, Longgang District, Shenzhen China

Product name: Z-WAVE STATIC CONTROLLER


Trademark: N/A

Model name: HKZW-STICK02, ZST10 700

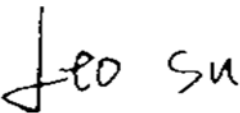
Standards: FCC Part 15.249

Test procedure: ANSI C63.10-2013


This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by: 

Danny Xu Oct. 22, 2020

Reviewed by: 

Leo Su Oct. 22, 2020

Approved by: 

Tom Xue Oct. 22, 2020

## 1 General description

### 1.1 Feature of equipment under test (EUT)

Equipment:	Z-WAVE STATIC CONTROLLER
Trade Name:	N/A
Model Name:	HKZW-STICK02
Serial Model:	ZST10 700
Model Difference:	All the models are the same circuit and RF module, except the model No..
Operation Frequency:	902-928 MHz
Modulation Type:	FSK
Antenna Type:	Spring antenna
Antenna Gain:	1dBi
Max. Field Strength:	88.64dBuV/m @ 908.42 MHz
Power Source:	DC 5V from laptop
Battery:	N/A
Hardware version:	V2.0
Software version:	V1.00

### 1.2 Operation channel list

Channel	Frequency(MHz)	Channel	Frequency(MHz)
0	908.42	1	916

### 1.3 Test Frequency Channel

Channel	Frequency(MHz)
0	908.42
1	916

### 1.4 EUT operation mode

During testing, RF test program provided by the manufacture to control the Tx operation followed the test requirement.

### 1.5 Ancillary equipment list

Laptop	E485	/	Lenovo
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## 2 Summary of Test Result

Test procedures according to the technical standards:

Item	FCC Part No.	Description of Test	Result
1	FCC Part15.203	Antenna Requirement	Pass
2	FCC Part15.207	AC power line conducted emission	Pass
3	FCC Part15.249(a)	Field strength of fundamental and harmonic emissions	Pass
4	FCC Part 15.215	20dB and 99% Bandwidth	Pass
5	FCC Part15.249(d)	Radiated spurious emission	Pass

### 3 Test Facilities and Accreditations

#### 3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao' an District, Shenzhen, Guangdong, China.
FCC Registration No.	448573

#### 3.2 Environmental conditions

Temperature:	15°C~35°C
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa

#### 3.3 Measurement uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %

RF frequency	$1 \times 10^{-7}$
RF power, conducted	$\pm 1$ dB
Conducted emission(150kHz~30MHz)	$\pm 2.5$ dB
Radiated emission(30MHz~1GHz)	$\pm 4.2$ dB
Radiated emission (above 1GHz)	$\pm 4.3$ dB
Temperature	$\pm 1$ degree
Humidity	$\pm 5$ %

#### 3.4 Test software

Software Name	Manufacturer	Model	Version
Bluetooth and WiFi Test System	Shenzhen JS tonscond co.,ltd	JS1120-3	2.5.77.0418

**4 List of test equipment**

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E043	EMI Test Receiver	Rohde&schwarz	ESC17	101166	2020/06/04	2021/06/03
MTI-E044	TRILOG Broadband Antenna	schwarzbeck	VULB 9163	9163-1338	2020/06/05	2021/06/04
MTI-E047	Amplifier	Hewlett-Packard	8447F	3113A06150	2020/06/04	2021/06/03
MTI-E089	ESG Vector Signal Generator	Agilent	N5182A	MY49060455	2020/06/03	2021/06/02
MTI-E058	ESG Series Analog Signal Generator	Agilent	E4421B	GB40051240	2020/07/03	2021/07/04
MTI-E062	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2020/06/04	2021/06/03
MTI-E066	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2020/06/04	2021/06/03
MTI-E078	Synthesized Sweeper	Agilent	83752A	3610A01957	2020/06/04	2021/06/03
MTI-E079	DC Power Supply	Agilent	E3632A	MY40027695	2020/06/04	2021/06/03
MTI-E045	Double Ridged Broadband Horn Antenna	schwarzbeck	BBHA 9120D	9120D-2278	2020/06/05	2021/06/04
MTI-E021	EMI Test Receiver	Rohde&schwarz	ESCS30	100210	2020/06/04	2021/06/03
MTI-E022	Pulse Limiter	Schwarzbeck	VSTD 9561-F	00679	2020/06/03	2021/06/02
MTI-E023	Artificial mains network	Schwarzbeck	NSLK 8127	NSLK 8127 #841	2020/06/04	2021/06/03
MTI-E046	Active Loop Antenna	Schwarzbeck	FMZB 1519B	00044	2020/06/05	2021/06/04
MTI-E048	Amplifier	Agilent	8449B	3008A02400	2020/07/03	2021/07/04
MTI-E072	Thermometer Clock Humidity Monitor	-	HTC-1	/	2020/06/07	2021/06/06

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## **5 Test Result**

### **5.1 Antenna requirement**

#### **5.1.1 Standard requirement**

FCC PART 15.203;

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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, 15.221, or §15.236. 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.

#### **5.1.2 EUT Antenna**

The antenna is a Spring antenna, which was permanently affixed to the device and un-replaced, complies with 15.203. In addition, the maximum antenna gain is 1dBi.



## 5.2 AC power line conducted emission

### 5.2.1 Limits

FCC §15.207;

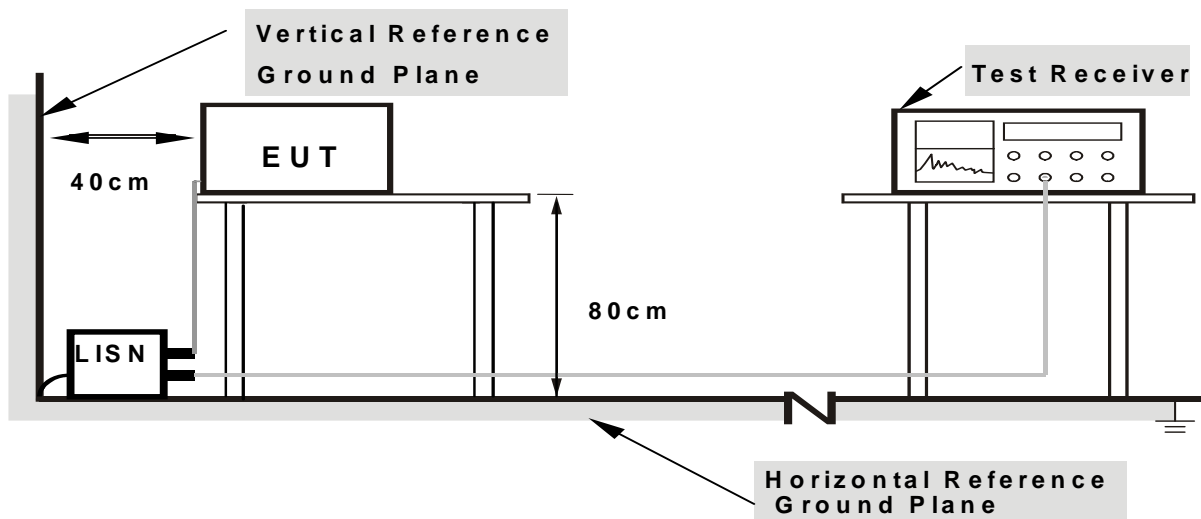
For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

Frequency (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 <sup>note2</sup>	56 - 46 <sup>note2</sup>
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note1: The tighter limit applies at the band edges.

Note2: The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

### 5.2.2 Test setup



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

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

### 5.2.3 Test procedure

a. EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b. The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

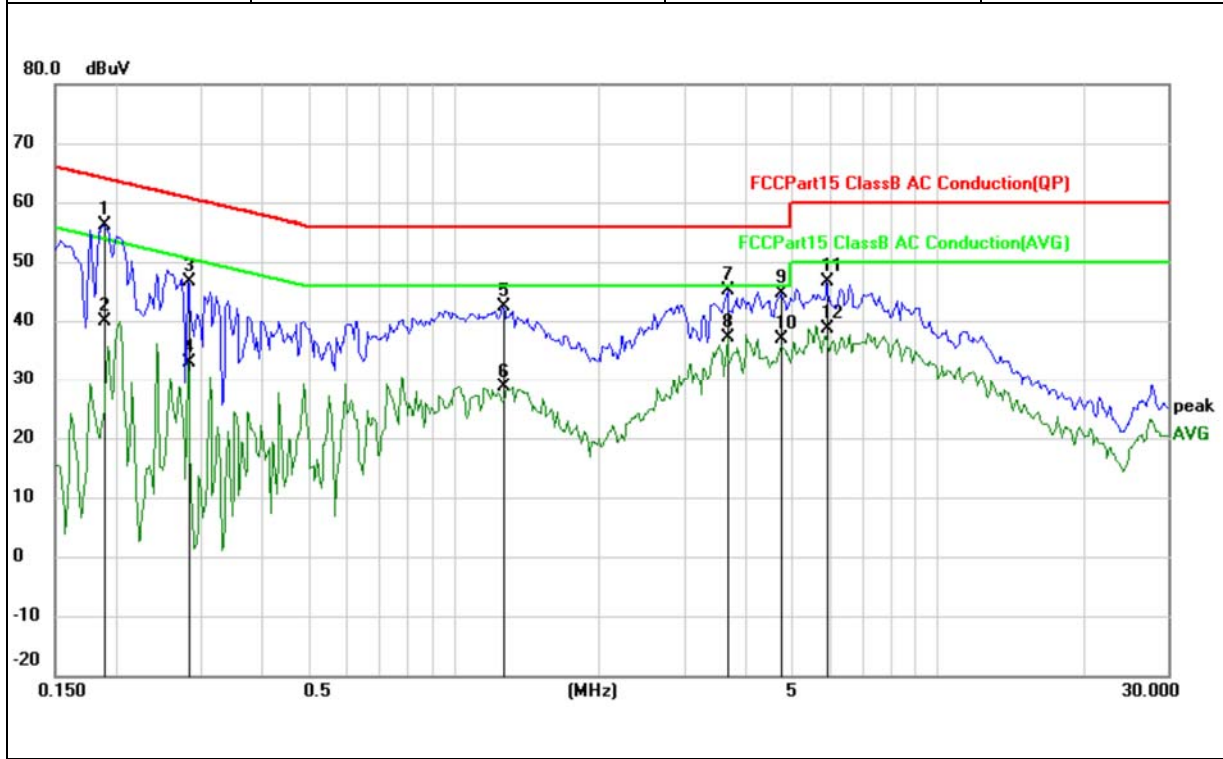
- c. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment's powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- d. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- e. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- f. LISN at least 80 cm from nearest part of EUT chassis.

For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 5.2.4 Test results



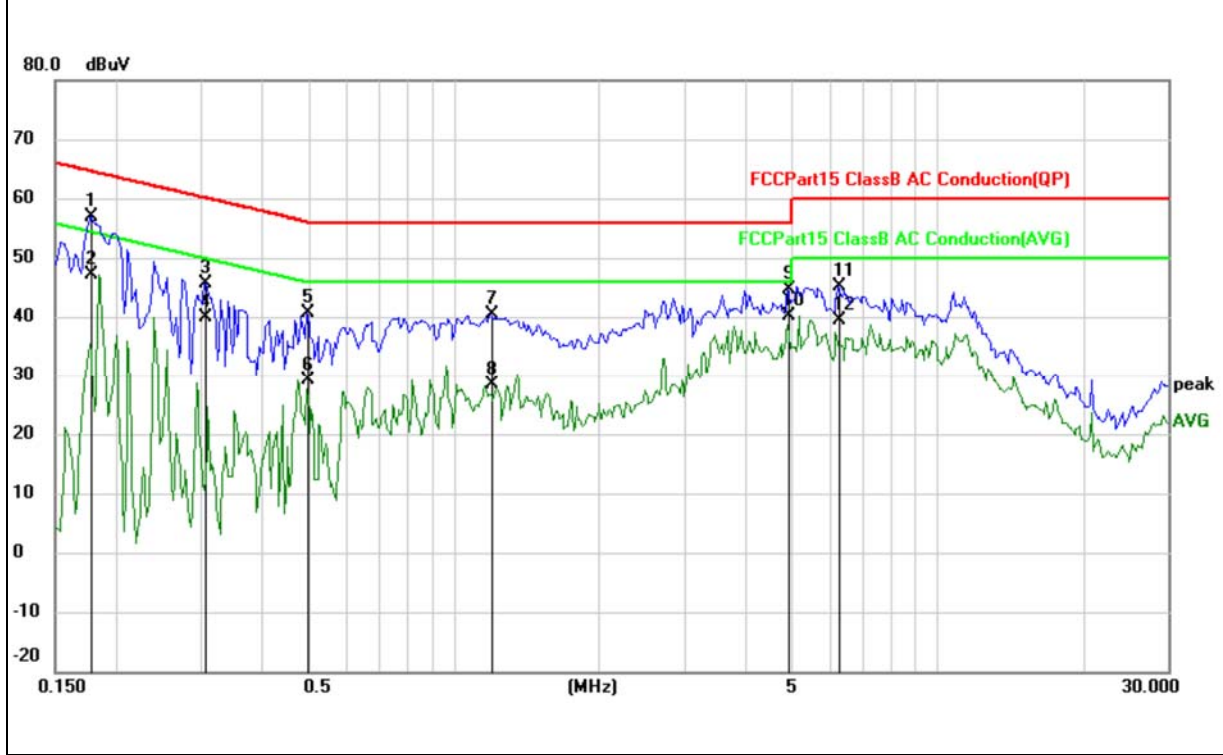
EUT:	Z-WAVE STATIC CONTROLLER	Model name:	HKZW-STICK02
Pressure:	1010hPa	Polarization:	L
Test voltage:	Laptop's adapter AC 120V/60Hz	Test mode:	Charging +TX



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1891	46.49	9.74	56.23	64.08	-7.85	QP
2		0.1891	30.09	9.74	39.83	54.08	-14.25	AVG
3		0.2828	36.94	9.76	46.70	60.73	-14.03	QP
4		0.2828	23.14	9.76	32.90	50.73	-17.83	AVG
5		1.2672	32.33	10.00	42.33	56.00	-13.67	QP
6		1.2672	18.62	10.00	28.62	46.00	-17.38	AVG
7		3.6875	35.18	10.05	45.23	56.00	-10.77	QP
8		3.6875	27.09	10.05	37.14	46.00	-8.86	AVG
9		4.7656	34.45	10.07	44.52	56.00	-11.48	QP
10		4.7656	26.69	10.07	36.76	46.00	-9.24	AVG
11		5.8983	36.58	10.13	46.71	60.00	-13.29	QP
12		5.8983	28.41	10.13	38.54	50.00	-11.46	AVG



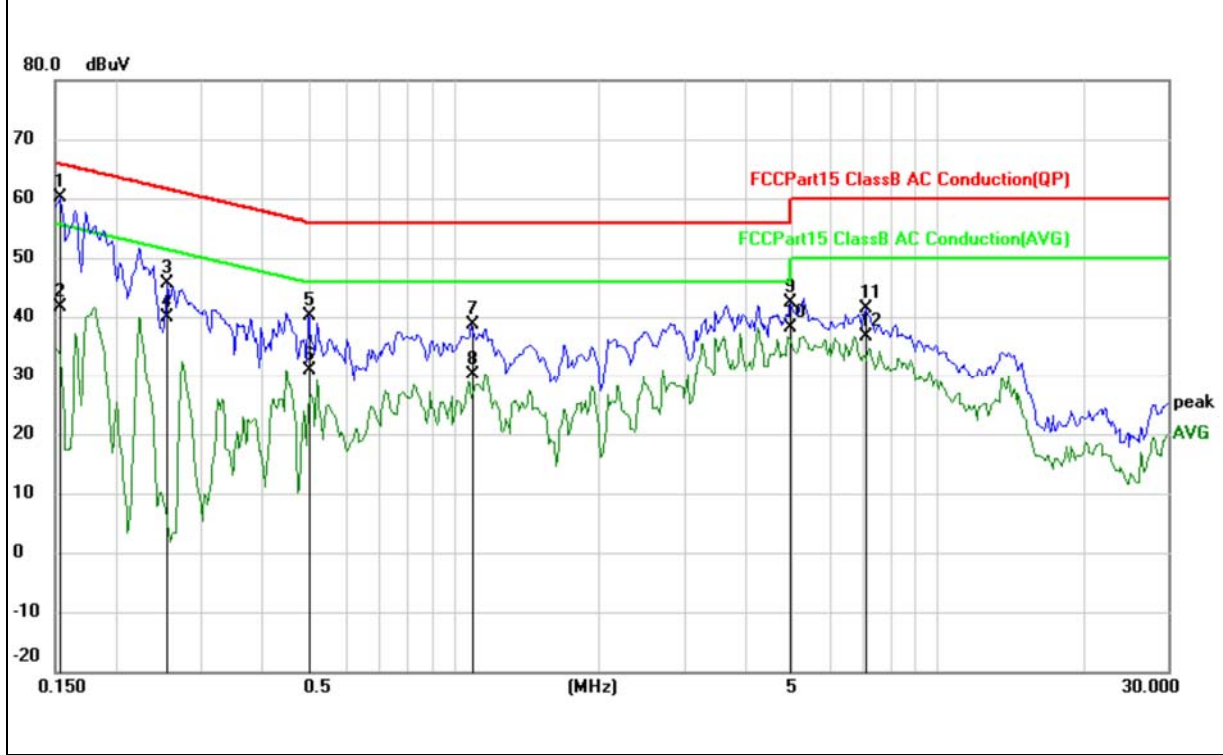
EUT:	Z-WAVE STATIC CONTROLLER	Model name:	HKZW-STICK02
Pressure:	1010hPa	Polarization:	N
Test voltage:	Laptop's adapter AC 120V/60Hz	Test mode:	Charging +TX



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1773	47.17	9.74	56.91	64.61	-7.70	QP
2		0.1773	37.38	9.74	47.12	54.61	-7.49	AVG
3		0.3063	35.91	9.78	45.69	60.07	-14.38	QP
4		0.3063	30.16	9.78	39.94	50.07	-10.13	AVG
5		0.4977	30.68	9.93	40.61	56.04	-15.43	QP
6		0.4977	19.24	9.93	29.17	46.04	-16.87	AVG
7		1.1930	30.31	9.99	40.30	56.00	-15.70	QP
8		1.1930	18.33	9.99	28.32	46.00	-17.68	AVG
9		4.9023	34.50	10.08	44.58	56.00	-11.42	QP
10	*	4.9023	30.05	10.08	40.13	46.00	-5.87	AVG
11		6.2227	35.04	10.14	45.18	60.00	-14.82	QP
12		6.2227	29.29	10.14	39.43	50.00	-10.57	AVG



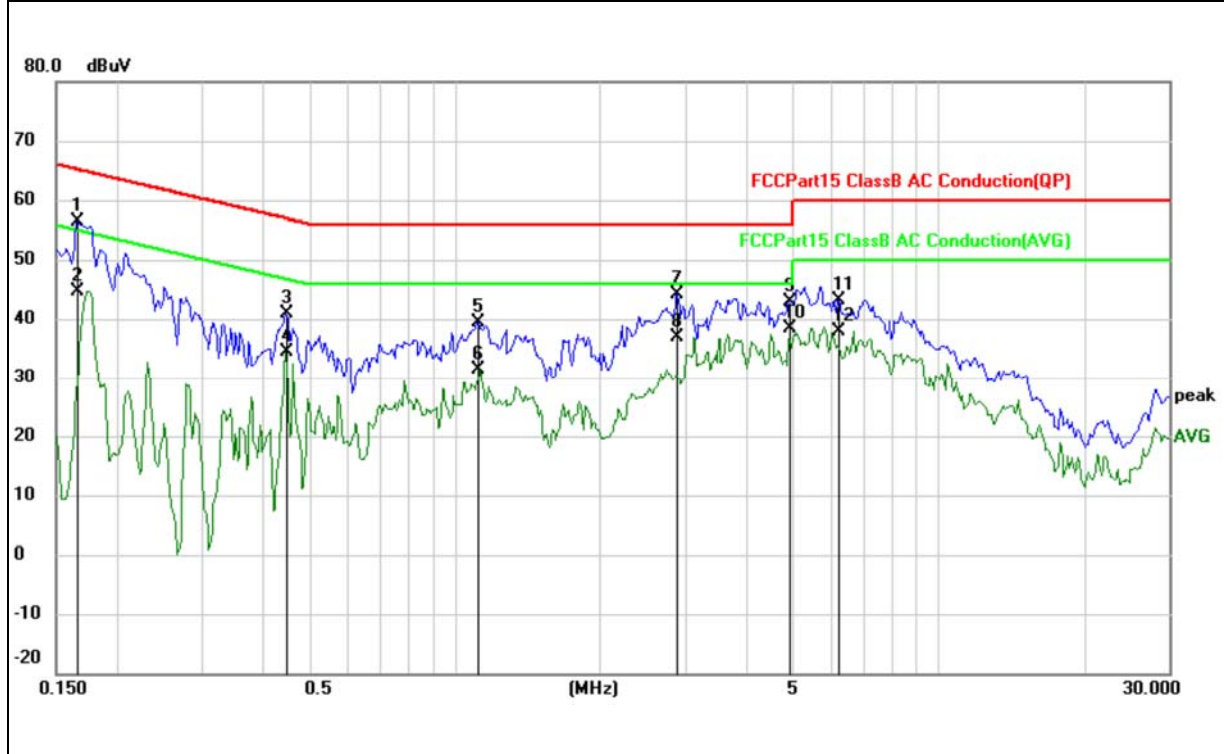
EUT:	Z-WAVE STATIC CONTROLLER	Model name:	HKZW-STICK02
Pressure:	1010hPa	Polarization:	L
Test voltage:	Laptop's adapter AC 240V/50Hz	Test mode:	Charging +TX



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.1539	50.33	9.74	60.07	65.79	-5.72	QP
2		0.1539	31.96	9.74	41.70	55.79	-14.09	AVG
3		0.2555	35.95	9.74	45.69	61.58	-15.89	QP
4		0.2555	30.05	9.74	39.79	51.58	-11.79	AVG
5		0.5016	30.20	9.93	40.13	56.00	-15.87	QP
6		0.5016	20.85	9.93	30.78	46.00	-15.22	AVG
7		1.0914	28.65	9.99	38.64	56.00	-17.36	QP
8		1.0914	20.19	9.99	30.18	46.00	-15.82	AVG
9		4.9648	32.20	10.08	42.28	56.00	-13.72	QP
10		4.9648	28.00	10.08	38.08	46.00	-7.92	AVG
11		7.1172	31.22	10.19	41.41	60.00	-18.59	QP
12		7.1172	26.47	10.19	36.66	50.00	-13.34	AVG



EUT:	Z-WAVE STATIC CONTROLLER	Model name:	HKZW-STICK02
Pressure:	1010hPa	Polarization:	N
Test voltage:	Laptop's adapter AC 240V/50Hz	Test mode:	Charging +TX



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1655	46.62	9.74	56.36	65.18	-8.82	QP
2		0.1655	34.91	9.74	44.65	55.18	-10.53	AVG
3		0.4469	31.05	9.89	40.94	56.93	-15.99	QP
4		0.4469	24.45	9.89	34.34	46.93	-12.59	AVG
5		1.1148	29.43	9.99	39.42	56.00	-16.58	QP
6		1.1148	21.51	9.99	31.50	46.00	-14.50	AVG
7		2.8844	34.15	10.03	44.18	56.00	-11.82	QP
8		2.8844	26.97	10.03	37.00	46.00	-9.00	AVG
9		4.9063	32.83	10.08	42.91	56.00	-13.09	QP
10	*	4.9063	28.37	10.08	38.45	46.00	-7.55	AVG
11		6.2148	33.11	10.14	43.25	60.00	-16.75	QP
12		6.2148	27.81	10.14	37.95	50.00	-12.05	AVG

### 5.3 Field strength of fundamental and harmonic emissions

#### 5.3.1 Limits

FCC §15.249(a);

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

The field strength limits shall be measured using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using an International Special Committee on Radio Interference (CISPR) quasi-peak detector

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

Frequency	Field Strength(dBuv/m)	Detector
Fundamental	94	QP
Harmonic emissions	74	PK
Harmonic emissions	54	AV

Note: 50mV/m=50000uv/m

$20 \cdot \log(50000\text{uV/m})=94\text{dBuv/m}$

PK limit reference 15.249(e)

#### 5.3.2 Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

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 analyser settings:

Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for  $f \geq 1\text{GHz}$ , 100 kHz for  $f < 1\text{GHz}$ , VBW  $\geq$  RBW, Sweep = auto, Detector function = peak, Trace = max hold

4. Follow the guidelines in ANSI C63.4-2014 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. The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

**5.3.3 Test Result**

Transmitter channel: 908.42MHz

	Frequency	Ant. Polarization	Emission level	Limits	Detector	Result: pass
	(MHz)	H / V	dB $\mu$ V/m	dB $\mu$ V/m		
Fundamental Frequency	908.42	V	88.64	94	QP	
	908.42	H	86.93	94	QP	
Harmonics Frequency	1816.84	V	59.92	74	PK	
	1816.84	H	66.42	74	PK	
	1816.84	V	44.92	54	AV	
	1816.84	H	46.39	54	AV	

Transmitter channel: 916MHz

	Frequency	Ant. Polarization	Emission level	Limits	Detector	Result: pass
	(MHz)	H / V	dB $\mu$ V/m	dB $\mu$ V/m		
Fundamental Frequency	916	V	86.38	94	QP	
	916	H	85.59	94	QP	
Harmonics Frequency	1832	V	57.18	74	PK	
	1832	H	66.15	74	PK	
	1832	V	49.27	54	AV	
	1832	H	49.89	54	AV	



## 5.4 20dB and 99% bandwidth

### 5.4.1 Limits

FCC §15.215(c)

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 5.4.2 Test method

Use the following spectrum analyzer settings:

#### For 20 dB bandwidth

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW  $\geq 1\%$  of the 20 dB bandwidth

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

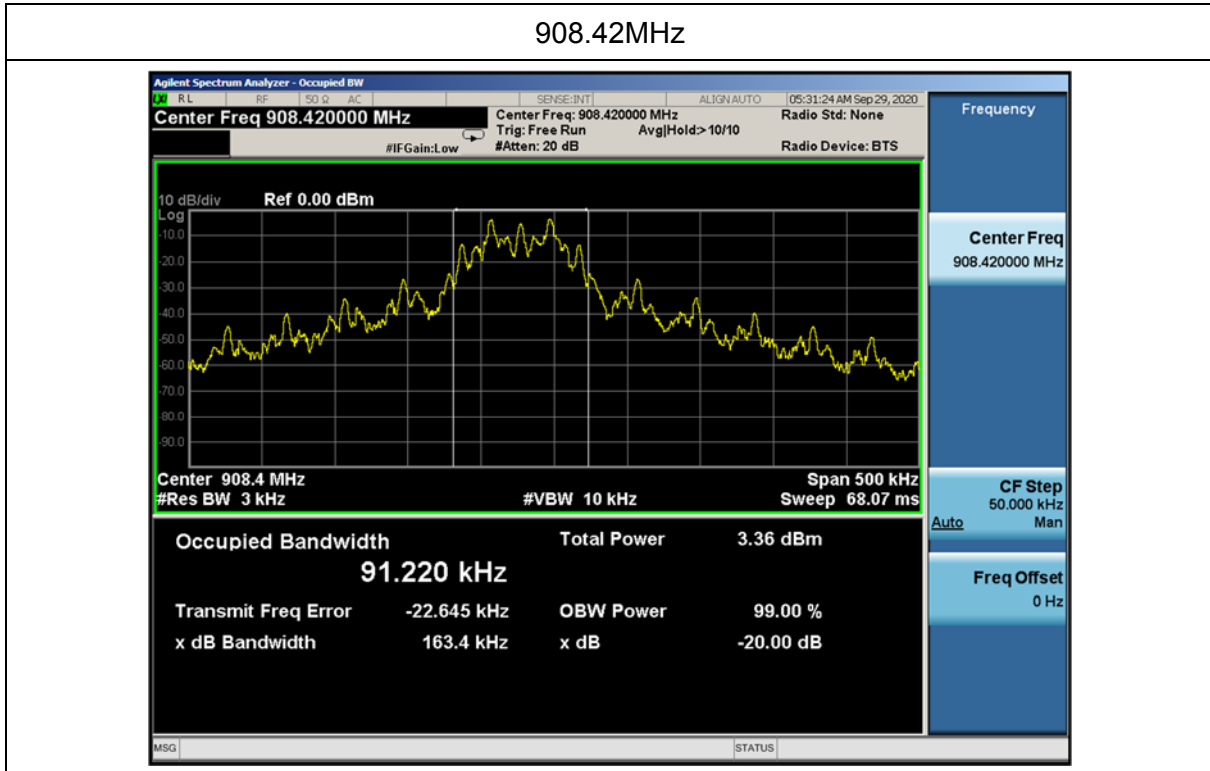
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth and 99% occupied bandwidth of the emission

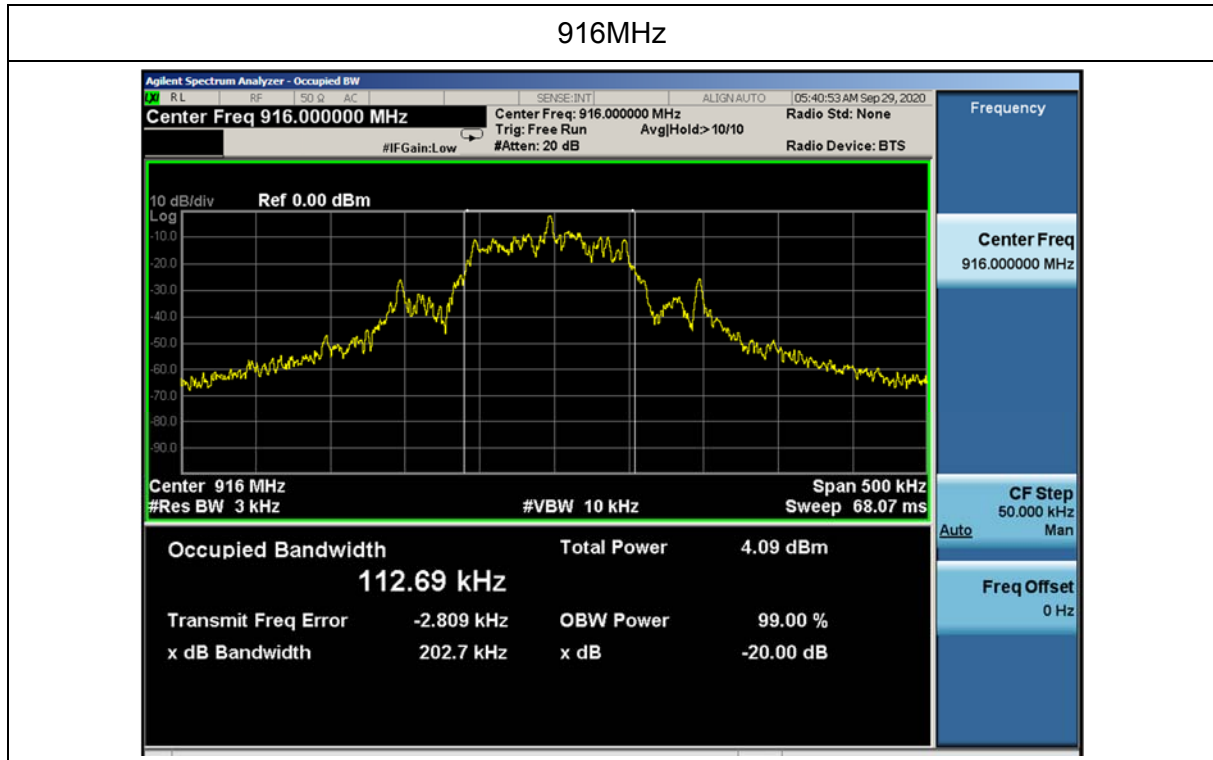


**5.4.3 Test result**

Frequency (MHz)	20dB bandwidth (MHz)
908.42	0.1634
916	0.2027

Test plots





## 5.5 Radiated spurious emission

### 5.5.1 Limit

FCC PART 15.249(a);

Except as provided in paragraph (a) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics ( $\mu\text{V/m}$ )
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

### 5.5.2 Test method

- a) The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.
- b) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- c) Use the following spectrum analyser settings:
  - 1) Span = wide enough to fully capture the emission being measured
  - 2) RBW = 1 MHz for  $f \geq 1\text{GHz}$ , 100 kHz for  $f < 1\text{GHz}$
  - 3) VBW  $\geq$  RBW, Sweep = auto
  - 4) Detector function = peak
  - 5) Trace = max hold
- d) Follow the guidelines in ANSI C63.4-2014 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.
- e) The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

### 5.5.3 Test Result

Note: If the PK measured values lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.

#### Below 30MHz

EUT:	Z-WAVE STATIC CONTROLLER	Model name. :	HKZW-STICK02
Pressure:	1010 hPa	Test voltage:	DC 5V from laptop
Test mode:	TX	Polarization :	--

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State P/F
--	--	--	--	Pass
--	--	--	--	Pass

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log(\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

**Radiation (30MHz – 1GHz)**

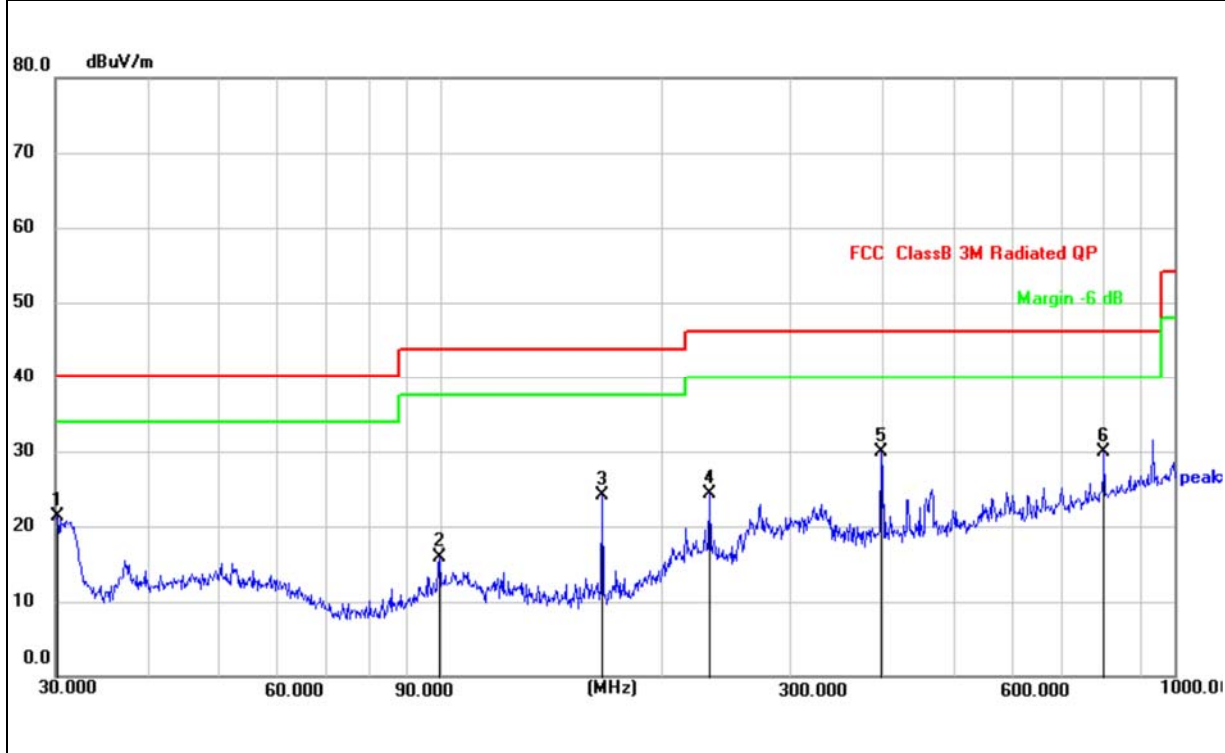
EUT:	Z-WAVE STATIC CONTROLLER	Model name:	HKZW-STICK02
Pressure:	1010hPa	Polarization:	H
Test voltage:	DC 5V from laptop	Test mode:	TX



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	54.6429	27.53	-14.04	13.49	40.00	-26.51	QP
2	121.9755	36.09	-16.15	19.94	43.50	-23.56	QP
3	166.6514	40.29	-16.25	24.04	43.50	-19.46	QP
4	233.3487	44.27	-12.64	31.63	46.00	-14.37	QP
5 *	400.4319	44.95	-9.00	35.95	46.00	-10.05	QP
6	699.3046	29.88	-3.47	26.41	46.00	-19.59	QP



EUT:	Z-WAVE STATIC CONTROLLER	Model name:	HKZW-STICK02
Pressure:	1010hPa	Polarization:	V
Test voltage:	DC 5V from laptop	Test mode:	TX



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.2111	37.61	-16.32	21.29	40.00	-18.71	QP
2	99.8777	30.71	-14.78	15.93	43.50	-27.57	QP
3	166.0680	40.38	-16.28	24.10	43.50	-19.40	QP
4	232.5318	37.06	-12.67	24.39	46.00	-21.61	QP
5	399.0302	38.85	-9.02	29.83	46.00	-16.17	QP
6 *	801.7863	31.50	-1.52	29.98	46.00	-16.02	QP

**Above 1GHz:**

Note:

- (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
- (2) Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor
- (3) All other emissions more than 20dB below the limit.

All the modulation modes have been tested, and the worst result was report as below:

Frequency	Read Level	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Remark	Comment
(MHz)	(dB $\mu$ V)	(dB)	dB/m	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)		
Channel 0(908.42 MHz)-Above 1G									
2725.34	62.34	4.36	32.92	45.53	54.09	74.00	-19.91	Pk	Vertical
2725.34	42.37	4.36	32.92	45.53	34.12	54.00	-19.88	AV	Vertical
3633.55	60.99	5.02	37.63	45.56	58.08	74.00	-15.92	Pk	Vertical
3633.55	42.38	5.02	37.63	45.56	39.47	54.00	-14.53	AV	Vertical
2725.24	64.46	4.36	32.92	45.53	56.21	74.00	-17.79	Pk	Horizontal
2725.24	41.60	4.36	32.92	45.53	33.35	54.00	-20.65	AV	Horizontal
3633.68	60.87	5.02	37.63	45.56	57.96	74.00	-16.04	Pk	Horizontal
3633.68	40.91	5.02	37.63	45.56	38.00	54.00	-16.00	AV	Horizontal
Channel 1(916 MHz)-Above 1G									
2748.22	64.19	4.41	33.01	45.76	55.85	74.00	-18.15	Pk	Vertical
2748.22	43.92	4.41	33.01	45.76	35.58	54.00	-18.42	AV	Vertical
3664.60	65.37	5.02	37.68	45.59	62.48	74.00	-11.52	Pk	Vertical
3664.60	41.18	5.02	37.68	45.59	38.29	54.00	-15.71	AV	Vertical
2748.37	61.87	4.41	33.01	45.76	53.53	74.00	-20.47	Pk	Horizontal
2748.37	41.62	4.41	33.01	45.76	33.28	54.00	-20.72	AV	Horizontal
3664.34	60.05	5.02	37.68	45.59	57.16	74.00	-16.84	Pk	Horizontal
3664.34	44.97	5.02	37.68	45.59	42.08	54.00	-11.92	AV	Horizontal



#### 5.5.4 Band edge-radiated

- Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).  
 (2) Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor  
 (3) All other emissions more than 20dB below the limit.

All the modulation modes have been tested, and the worst result was report as below:

Frequency	Meter Reading	Cable Loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dB $\mu$ V)	(dB)	dB/m	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	Type	
FSK(908.42 MHz)									
902	43.37	2.40	27.70	40.40	33.07	94	-60.93	QP	Horizontal
902	42.20	2.40	27.70	40.40	31.90	94	-62.1	QP	Vertical
928	43.85	2.44	28.30	40.10	34.49	94	-59.51	QP	Vertical
928	43.37	2.44	28.30	40.10	34.01	94	-59.99	QP	Horizontal

## Photographs of the Test Setup

Radiated emission – below 1GHz



Radiated emission – above 1GHz





Conducted emission





## Photographs of the EUT

See the APPENDIX 1: EUT PHOTO in the report No.: MTi20082708-1E1-1.

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