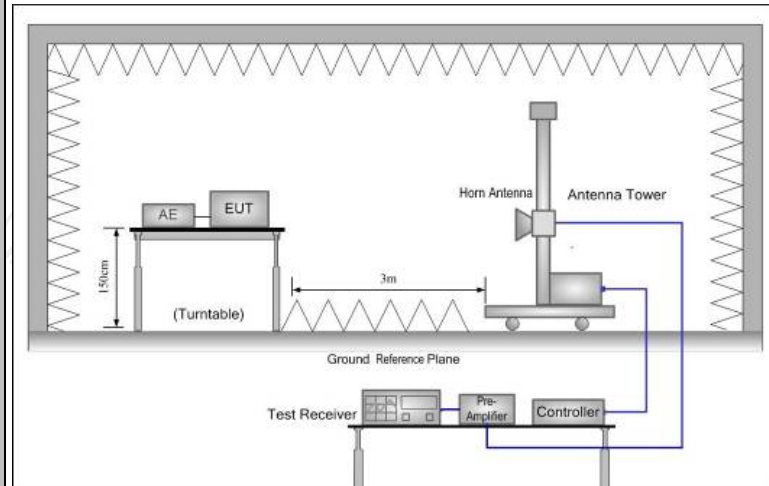


Above 1GHz



**Test Mode:**

Transmitting mode with modulation

**Test Procedure:**

1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. For the radiated emission test below 1GHz:  
The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.
- For the radiated emission test above 1GHz:  
Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT,

	<p>depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.</p> <p>3. Set to the maximum power setting and enable the EUT transmit continuously.</p> <p>4. Use the following spectrum analyzer settings:</p> <p>(1) Span shall wide enough to fully capture the emission being measured;</p> <p>(2) Set RBW=100 kHz for <math>f &lt; 1</math> GHz, RBW=1MHz for <math>f &gt; 1</math>GHz ; VBW<math>\geq</math>RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak</p> <p>(3) For average measurement: use duty cycle correction factor method per 15.35(c). Duty cycle = On time/100 milliseconds On time = <math>N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n</math> Where <math>N_1</math> is number of type 1 pulses, <math>L_1</math> is length of type 1 pulses, etc. Average Emission Level = Peak Emission Level + <math>20 * \log(\text{Duty cycle})</math></p> <p>Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level</p>
<b>Test results:</b>	PASS

6.11.2. Test Instruments

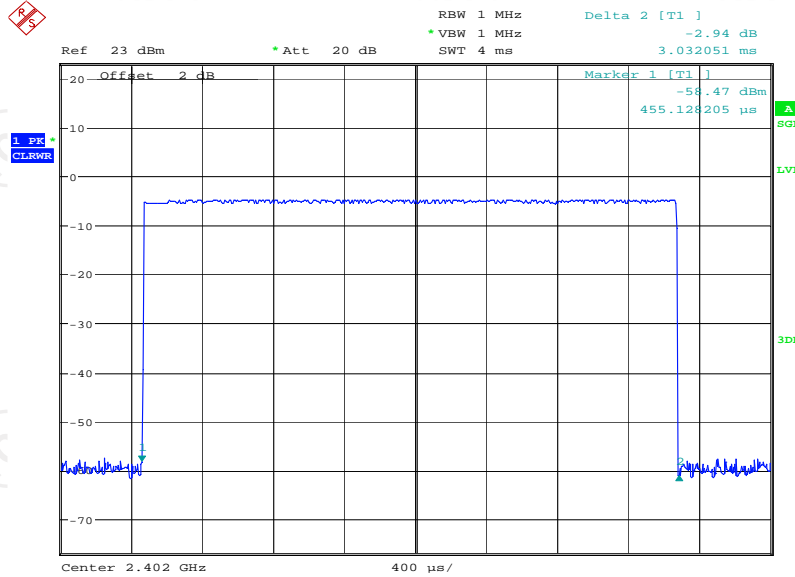
Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESPI Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep. 11, 2016
Spectrum Analyzer	ROHDE&SCHW ARZ	FSEM	848597/001	Sep. 11, 2016
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 12, 2016
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 11, 2016
Pre-amplifier	HP	8447D	2727A05017	Sep. 11, 2016
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 13, 2016
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 13, 2016
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 13, 2016
Horn Antenna	Schwarzbeck	BBHA 9170	373	Sep. 13, 2016
Antenna Mast	CCS	CC-A-4M	N/A	N/A
Coax cable	TCT	RE-low-01	N/A	Sep. 11, 2016
Coax cable	TCT	RE-high-02	N/A	Sep. 11, 2016
Coax cable	TCT	RE-low-03	N/A	Sep. 11, 2016
Coax cable	TCT	RE-high-04	N/A	Sep. 11, 2016
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

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

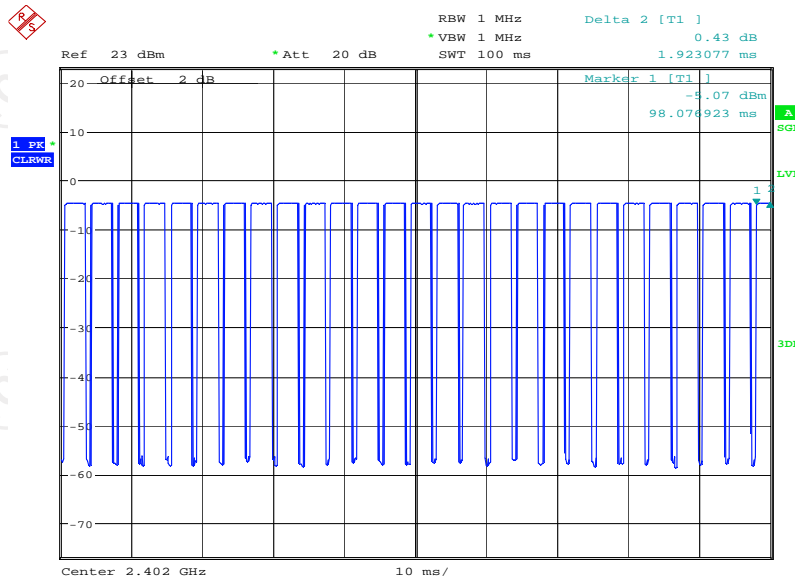
6.11.3. Test Data

Duty cycle correction factor for average measurement

DH5 on time (One Pulse) Plot on Channel 00



DH5 on time (Count Pulses) Plot on Channel 00



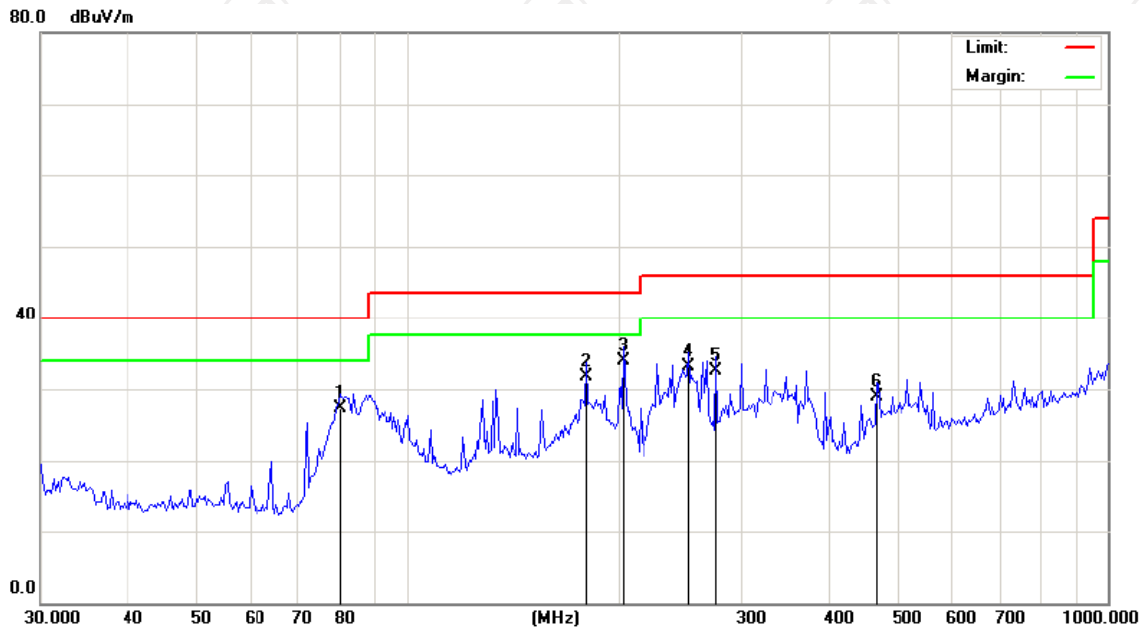
**Note:**

1. Worst case Duty cycle = on time/100 milliseconds = (3.032\*26+1.923)/100=0.80599
2. Worst case Duty cycle correction factor = 20\*log (Duty cycle) = -1.87dB
3. DH5 has the highest duty cycle worst case and is reported.
4. The average levels were calculated from the peak level corrected with duty cycle correction factor (-1.87dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

Please refer to following diagram for individual

Below 1GHz

Horizontal:

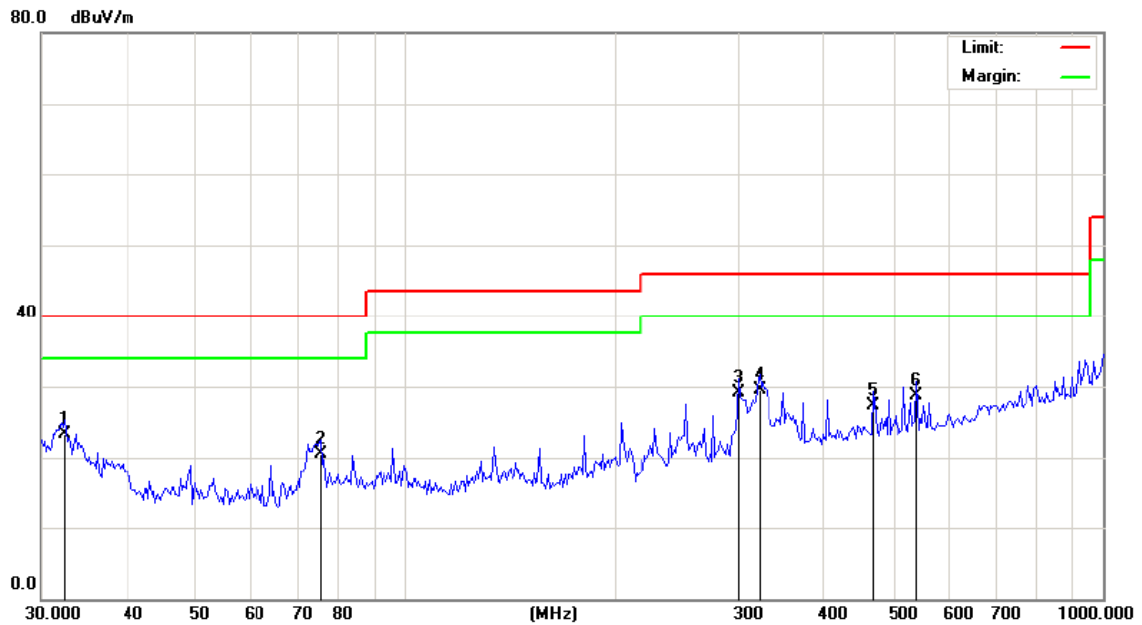


Site: Polarization: **Horizontal** Temperature: 25  
 Limit: FCC Part 15B Class B RE\_3 m Power: Humidity: 54 %

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1	80.2065	43.59	-16.28	27.31	40.00	-12.69	QP		0	
2	180.1540	44.76	-13.05	31.71	43.50	-11.79	QP		0	
3 *	203.8616	45.40	-11.54	33.86	43.50	-9.64	QP		0	
4	252.3916	42.99	-9.88	33.11	46.00	-12.89	QP		0	
5	276.1360	41.53	-9.07	32.46	46.00	-13.54	QP		0	
6	468.3072	32.91	-3.99	28.92	46.00	-17.08	QP		0	



Vertical:



Site: Polarization: **Vertical** Temperature: 25  
 Limit: FCC Part 15B Class B RE\_3 m Power: Humidity: 54 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		32.4555	36.73	-13.41	23.32	40.00	-16.68	QP		0	
2		75.3987	36.82	-16.41	20.41	40.00	-19.59	QP		0	
3		300.4211	37.40	-8.24	29.16	46.00	-16.84	QP		0	
4	*	321.3783	37.41	-7.81	29.60	46.00	-16.40	QP		0	
5		468.3072	31.37	-3.99	27.38	46.00	-18.62	QP		0	
6		541.9813	31.15	-2.54	28.61	46.00	-17.39	QP		0	

**Note:** 1. The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported

2. Measurements were conducted in all three channels (high, middle, low) and three modulation (GFSK, Pi/4 DQPSK, 8DPSK), and the worst case Mode (Highest channel and GFSK) was submitted only.

**Above 1GHz**

Modulation Type: GFSK									
Low channel: 2402 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
2390	H	44.03	---	-8.27	35.76	---	74	54	-18.24
4804	H	44.23	---	0.66	44.89	---	74	54	-9.11
7206	H	34.24	---	9.5	43.74	---	74	54	-10.26
---	H	---	---	---	---	---	---	---	---
2390	V	43.68	---	-8.27	35.41	---	74	54	-18.59
4804	V	45.37	---	0.66	46.03	---	74	54	-7.97
7206	V	40.26	---	9.5	49.76	---	74	54	-4.24
---	V	---	---	---	---	---	---	---	---

Middle channel: 2441 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
4882	H	41.59	---	0.99	42.58	---	74	54	-11.42
7323	H	38.72	---	9.87	48.59	---	74	54	-5.41
---	H	---	---	---	---	---	---	---	---
4882	V	42.79	---	0.99	43.78	---	74	54	-10.22
7323	V	39.07	---	9.87	48.94	---	74	54	-5.06
---	V	---	---	---	---	---	---	---	---

High channel: 2480 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
2483.5	H	45.74	---	-7.83	37.91	---	74	54	-16.09
4960	H	47.77	---	1.33	49.1	---	74	54	-4.9
7440	H	39.77	---	10.22	49.99	---	74	54	-4.01
---	H	---	---	---	---	---	---	---	---
2483.5	V	48.11	---	-7.83	40.28	---	74	54	-13.72
4960	V	47.03	---	1.33	48.36	---	74	54	-5.64
7440	V	39.23	---	10.22	49.45	---	74	54	-4.55
---	V	---	---	---	---	---	---	---	---

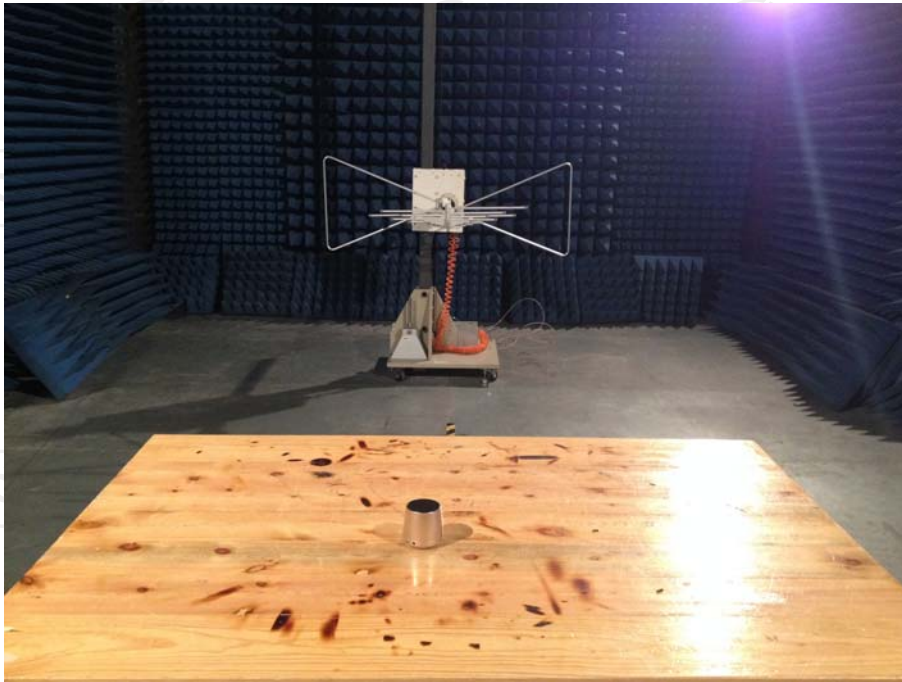
**Note:**

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dB $\mu$ V/m)-Average limit (dB $\mu$ V/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
5. Data of measurement shown “---“in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.
6. Measurements were conducted in all three modulation (GFSK, Pi/4 DQPSK, 8DPSK), and the worst case Mode (GFSK) was submitted only.

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



### Appendix A: Photographs of Test Setup Radiated Emission





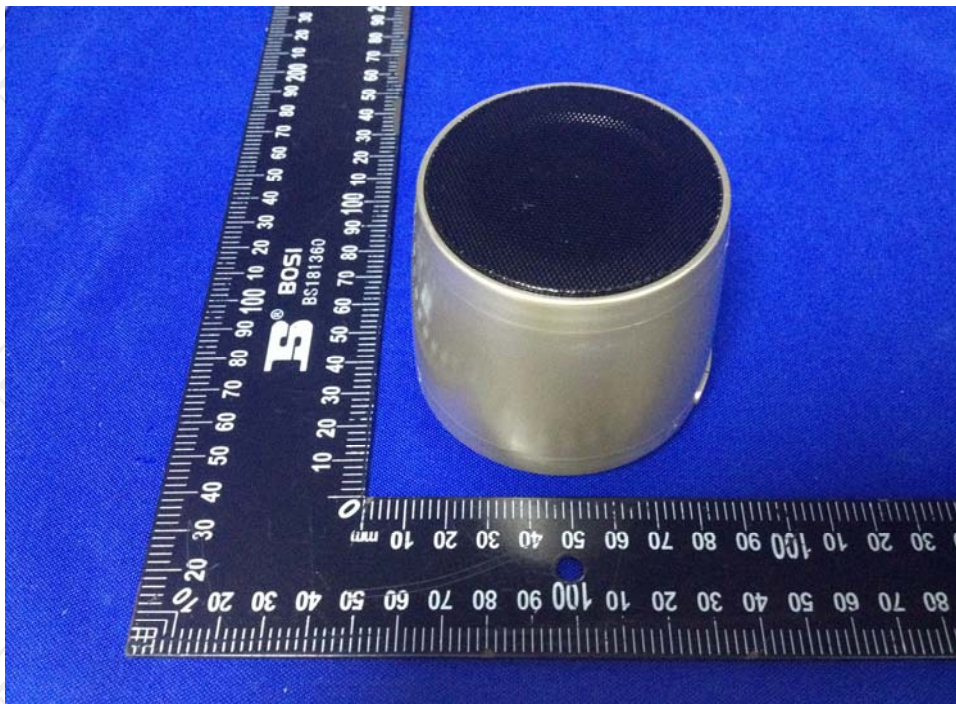
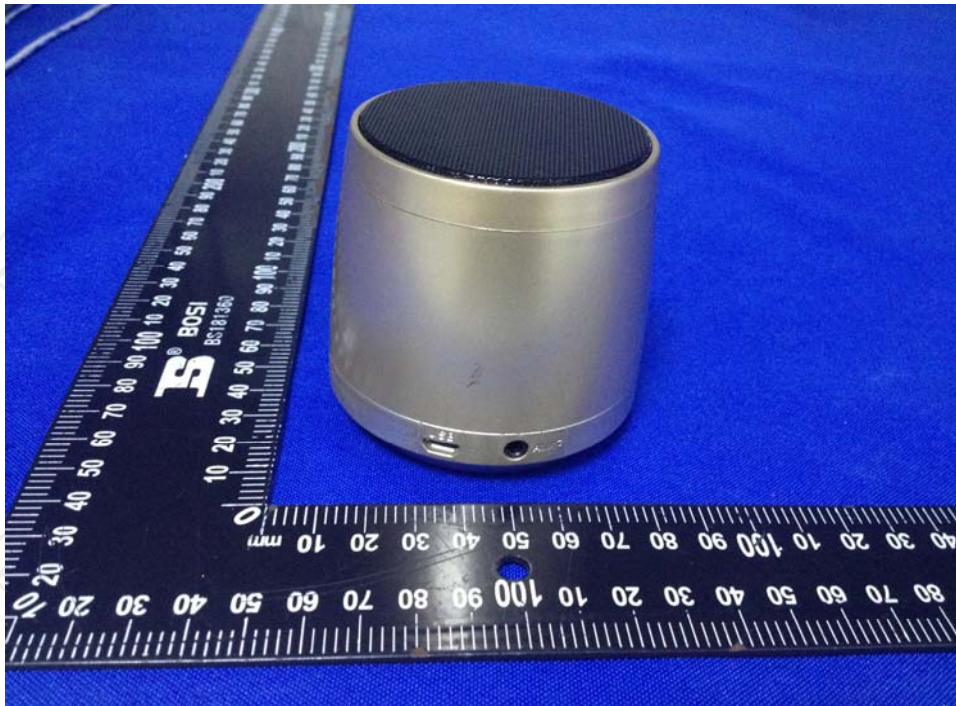
CE



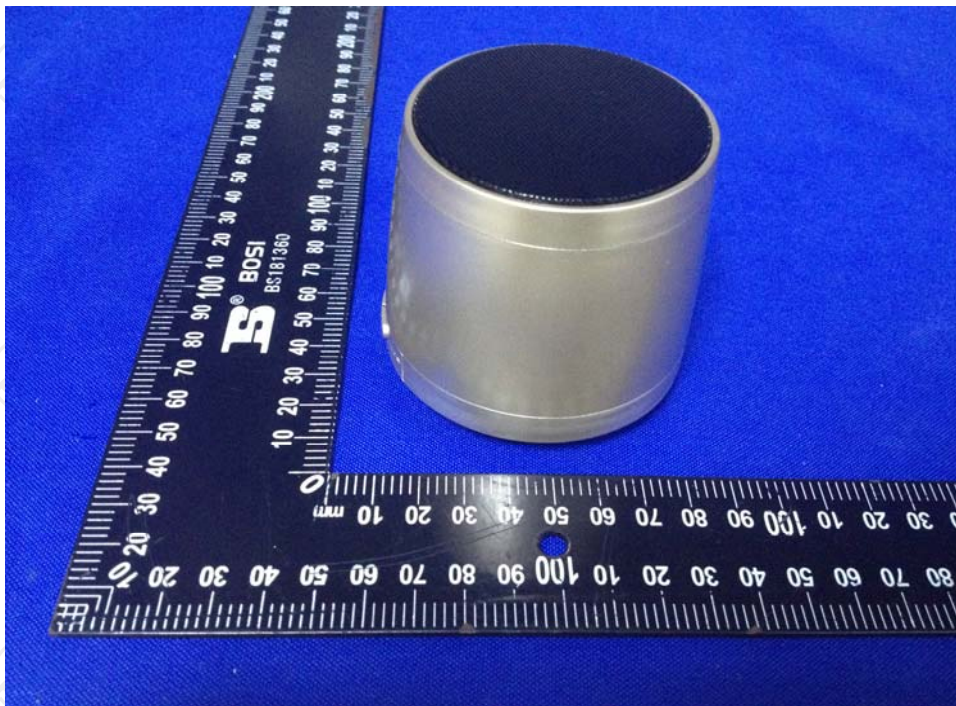
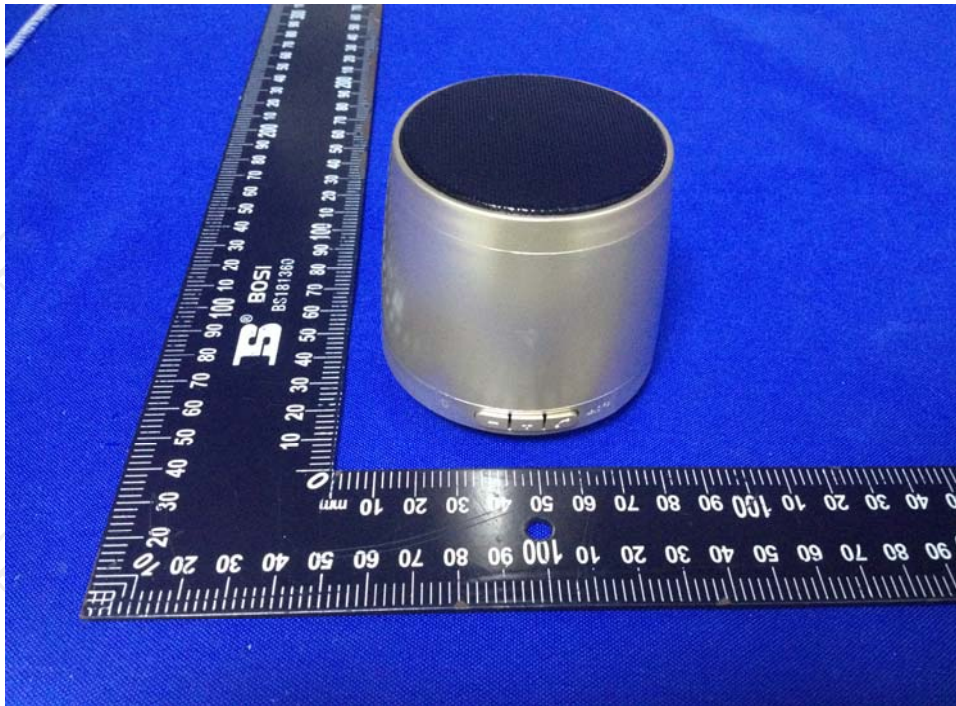
**Appendix B: Photographs of EUT  
Model: SP3173  
External Photos**

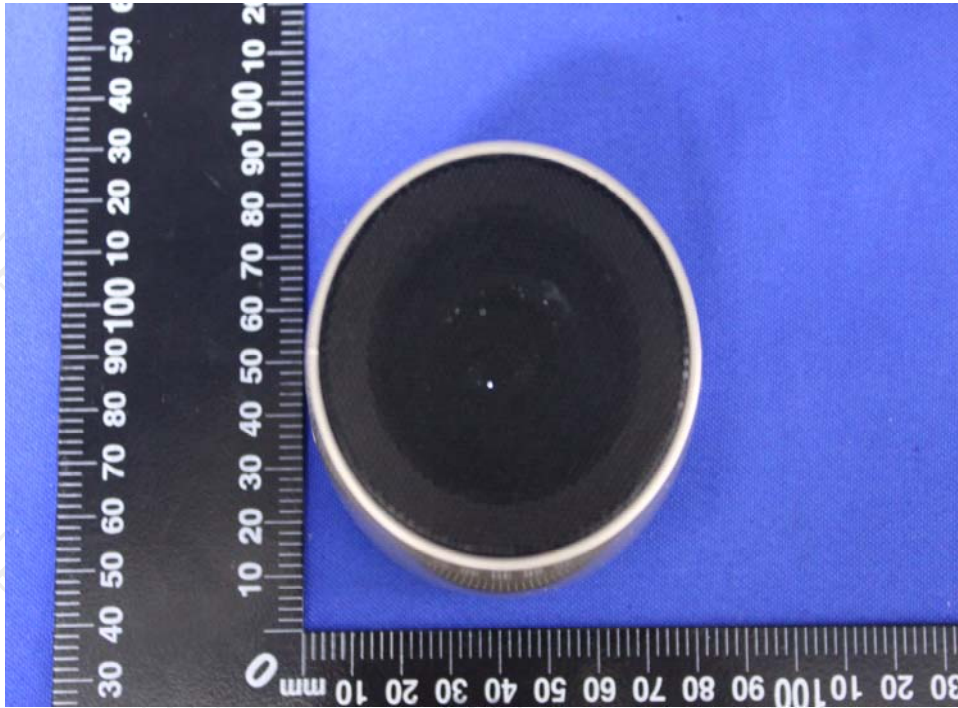














**Model: SP3173**  
**Internal Photos**

