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Assessment report No:

NIE: 52954RAN.002A3

Assessment report (Modification 3)
RF EXPOSURE REPORT ACCORDING TO
FCC 47 CFR Part 2.1093
ISED RSS -102 Issue 5:2015

Identification of item tested.....:	Sensor Beacon
Trade mark .....:	Pioneer
Model and /or type reference .....:	TMX-CB10
Other identification of the product .....:	FCC ID : VIYHRM5087 IC ID : 7305A-HRM5087
Final HW version .....:	1.xx
Final SW version .....:	1.xx
Features.....:	Bluetooth Ver4.2
Manufacturer.....:	HOSIDEN CORPORATION 4-33, Kitakyuhouji 1-chome, Yao City, Osaka, 581-0071, Japan
Test method requested, standard.....:	FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices. ISED RSS-102 Issue 5 (2015-03) – Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
Summary .....:	IN COMPLIANCE
Approved by (name / position & signature) .....:	Miguel Lacave Antennas Lab Manager  MIGUEL LACAVE GARCÍA 2017.05.15 14:47:46 +02'00'
Date of issue .....:	2017-05-15
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Index

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Identification of the client

HOSIDEN CORPORATION

4-33, Kitakyuhouji 1-chome, Yao City, Osaka, 581-0071, Japan

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 52954RAN.002A2 related with the same samples, in the next clauses and sub-clauses:

Clauses / Sub-clauses	Modification	Justification
Appendix B	Exemption limits corrected	Typo

This modification test report cancels and replaces the test report 52954RAN.002A2.

General description of the device under evaluation

The device under evaluation is a sensor terminal to be used by plugging it into a car cigar lighter socket. It works with a smartphone on which applications supporting this product are installed.

The maximum time-averaged output power value and maximum antennga gain values declared by the manufacturer for each transmitting channel are:

Mode	Frequency (MHz)	Max. Average conducted power (dBm)	Max. Antenna Gain (dBi)
Bluetooth 4.2	2402	4.36	+0.5
	2440	4.30	+0.5
	2480	4.27	+0.5

Table 1: Average conducted power values

Assessment summary

Radiofrequency radiation exposure limits			
FCC 47 CFR § 2.1091 & ISED RSS-102 Issue 5 (2015-03)			
Band (MHz)	**Technology**	**Band**	**VERDICT (Pass/Fail)**
2450	Bluetooth 4.2	ISM	Pass

Table 2: Assessment summary.

Appendix A – FCC RF Exposure

FCC Exposure evaluation portable or mobile devices

Human exposure to RF emissions from portable devices (47 CFR §2.1093), as defined by the FCC, must be evaluated with respect to the FCC-adopted limits for SAR. Evaluation of mobile devices, as defined by the FCC, may also be performed with respect to SAR limits, but in such cases it is usually simpler and more cost-effective to evaluate compliance with respect to field strength or power density limits. For certain devices that are designed to be used in both mobile and portable configurations similar to those described in 47 CFR §2.1091(d)(4), such as certain desktop phones and wireless modem modules, compliance for mobile configurations is also satisfied when the same device is evaluated for SAR compliance in portable configurations.

FCC SAR test exclusion considerations

According to FCC OET KDB 447498 D01 General RF Exposure Guidance:

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition is satisfied.

- For distances ≤ 50 mm

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [√f(GHz)]

≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

Where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table:

MHz	5	10	15	20	25	30	35	40	45	50	mm
150	39	77	116	155	194	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	164	192	219	246	274	
450	22	45	67	89	112	134	157	179	201	224	
835	16	33	49	66	82	98	115	131	148	164	
900	16	32	47	63	79	95	111	126	142	158	
1500	12	24	37	49	61	73	86	98	110	122	
1900	11	22	33	44	54	65	76	87	98	109	
2450	10	19	29	38	48	57	67	77	86	96	
3600	8	16	24	32	40	47	55	63	71	79	
5200	7	13	20	26	33	39	46	53	59	66	
5400	6	13	19	26	32	39	45	52	58	65	
5800	6	12	19	25	31	37	44	50	56	62	

Table 3: SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

- For distances > 50 mm

At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:

[Power allowed at numeric threshold for 50 mm in table 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz

[Power allowed at numeric threshold for 50 mm in table 1) + (test separation distance - 50 mm)·10] mW, at > 1500 MHz and ≤ 6 GHz

Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table

MHz	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	SAR Test Exclusion Threshold (mW)
150	387	397	407	417	427	437	447	457	467	477	487	497	507	517	527	
300	274	294	314	334	354	374	394	414	434	454	474	494	514	534	554	
450	224	254	284	314	344	374	404	434	464	494	524	554	584	614	644	
835	164	220	275	331	387	442	498	554	609	665	721	776	832	888	943	
900	158	218	278	338	398	458	518	578	638	698	758	818	878	938	998	
1500	122	222	322	422	522	622	722	822	922	1022	1122	1222	1322	1422	1522	
1900	109	209	309	409	509	609	709	809	909	1009	1109	1209	1309	1409	1509	
2450	96	196	296	396	496	596	696	796	896	996	1096	1196	1296	1396	1496	
3600	79	179	279	379	479	579	679	779	879	979	1079	1179	1279	1379	1479	
5200	66	166	266	366	466	566	666	766	866	966	1066	1166	1266	1366	1466	
5400	65	165	265	365	465	565	665	765	865	965	1065	1165	1265	1365	1465	
5800	62	162	262	362	462	562	662	762	862	962	1062	1162	1262	1362	1462	

Table 4: SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and > 50 mm

FCC Evaluation Results

The maximum conducted peak output power for the device declared by the manufacturer is 4.36 dBm, which corresponds to 2.729 mW.

The evaluation according to an intended use distance of 5 mm will be as follow:

Protocol	Max Declared Time Avg. Output Power (dBm)		Min. Test Distance (mm)	Freq. (GHz)	Result	Test Exclusion
	(dBm)	(mW)				
Bluetooth 4.2	4.36	2.729	5	2.402	0.85	PASS

Table 5: Evaluation Result

The computed 0.85 value is < 3.0, so according to KDB 447498 D01 – General RF Exposure Guidance, this mode qualifies for Standalone SAR test exclusion for 1-g SAR and 10-g SAR.

Appendix B – ISED RF Exposure

ISED SAR test exclusion considerations

According to "RSS-102 Issue 5 (2015-03) – Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", paragraph "2.5.1 Exemption Limits for Routine Evaluation – SAR Evaluation", the device operates below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1:

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance[4,5]

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

Output Power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based time-averaged output power. If the operating frequency of the device is between two frequencies lotaced in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required

ISED Evaluation Results

According to paragraph "2.5.1 Exemption Limits for Routine Evaluation – SAR Evaluation", the exemption limits for the applicable separation distance have been calculated by linear interpolation for the following operating frequencies:

Frequency (MHz)	Distance (mm)	Exemption Limits (mW)
2402	5	4.26
2440	5	4.05
2480	5	3.95

Table 6: Exemption Limits

The evaluation for the applicable output power levels and exemption limits for each operating frequency and technology will be as follow:

Technology	Frequency (MHz)	Max. Declared Time Avg. Output Power (dBm)	Antenna Gain (dBi)	Max. Declared Time Avg. Output Power + Antenna gain (dBm)	Max. Declared Time Avg. Output Power + Antenna gain (mW)	ISED Exemption Limits (mW)	Verdict
Bluetooth 4.2	2402	4.36	+0.5	4.86	3.06	4.26	PASS
	2440	4.30	+0.5	4.80	3.02	4.05	PASS
	2480	4.27	+0.5	4.77	3.00	3.95	PASS

Table 7: Evaluation Result

As all operating frequencies comply with SAR Test Exclusion Thresholds, according to the standard "ISED RSS-102 Issue 5 (2015-03)", SAR testing is not required.